NOVEMBER 29, 1954

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

TEXAS GULF COAST

Metalworking moves in as rising population, booming oil, gas, chemical industries create big new demands
—page 46

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Check the facts . . . facts obtained from experience of many installations . . . and you will agree that EC&M skip hoist Control gives smoother, more efficient performance under all conditions.

Experience shows that EC&M Control for skip hoists allows high speed output on the incline, and assures accurate stopping, regardless of the weight in the bucket.

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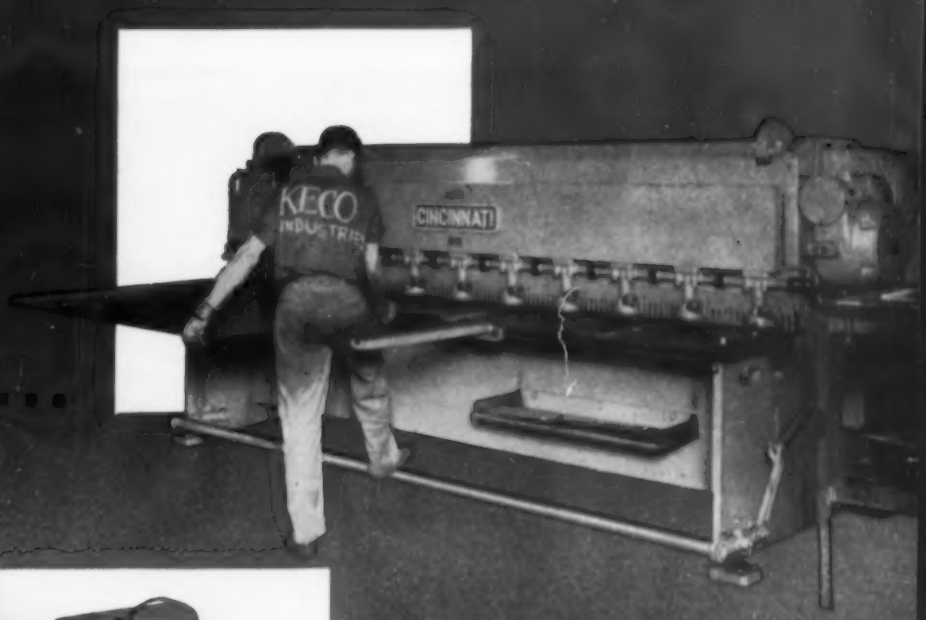
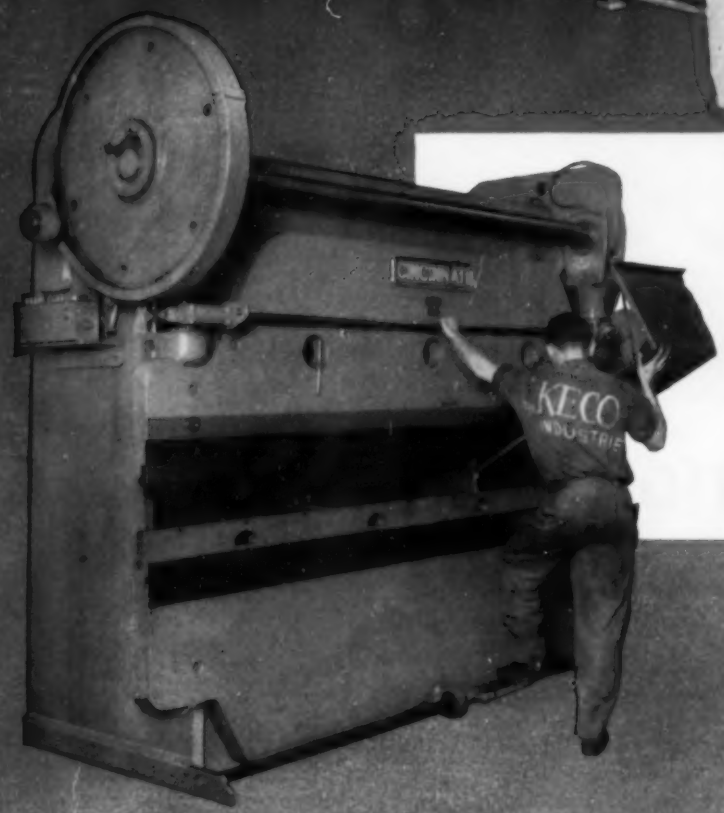


with this CINCINNATI team



Photographs courtesy of the Keco Industries, Cincinnati 25, Ohio

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The floor-to-floor time consumed in shearing and forming panels for air-conditioning units, was cut from 12 minutes to 4 minutes at Keco Industries, using a Cincinnati Brake and a Cincinnati Shear.

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This Week in Metalworking

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

Vol. 135 No. 22 November 29, 1954

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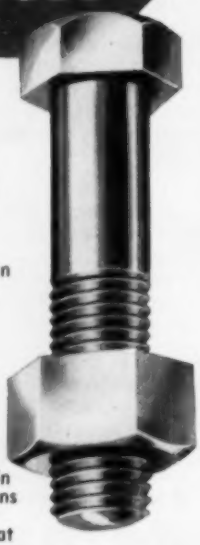

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"The Bolt Man"

behind the scenes

Come In, Huntington

Last Tuesday we mailed $5 to Mr. W. W. Callender, Steel Products Division, West Virginia Steel & Mfg. Co., Huntington, W. Va., not because he was top man on a chain letter list, but because he was top man in our Production Index contest. Regular readers of this column (here we pause to listen to the chorus: "Are there any?") will recall that back in early October we invited estimates of STEEL's Industrial Production Index for the week of November 8. Long range forecasting of business weather is no easy chore, but to informed readers of STEEL the task is routine. Editors Bob Jaynes and Jim Morrissey had backed their private prophesies with a Tin Roof, some sort of a frozen confection, we believe, shingled with peanuts. We opened the contest to STEEL's 140,000 readers, a sly maneuver calculated to supply us in advance with inside dope on business.

Well, the actual corrected figure for STEEL's Industrial Production Index for the week of November 8 was 127.4. On October 20 Mr. Callender went into a huddle with himself, and came up with 126.7! This astonishing ability to peer into the future suggests occultism, or at least intimacy with a neighbor who knows his way around in astrology. In any event, from now on Mr. Callender's opinions should be worth their weight in dividends. We congratulate him—and also the West Virginia Steel & Mfg. Co. for shrewdly keeping him under wraps. A man that cozy with the future should be a wonderful industrial asset. (Pss-ss-st! Mr. Callender; do you like anything in the 5th at Bowie?)

Optimism & Gloom

Most of our guest forecasters hovered in the 120's, but only five optimists went to 124 or better. Associate Editor Bob Jaynes was right behind Mr. W. W. Callender with a respectable guess of 126.5, which was exactly one Tin Roof better than Assistant Editor Jim Morrissey's 125.3

Harry E. Adams, Methods Engineer, Solar Aircraft Co., 1901 Bell Ave., Des Moines, Iowa, bravely underwrote 124.7, and Norman W. Scherer, Klotz Machine Co., Sandusky, Ohio, came out with a cautious 124 on the nose. These men either had faith in their convictions, or were convicted by their faith: none sold business short.

Two of the lowest estimates were sent in by J. S. Cruickshanks, Cruickshanks Iron Works, Richmond 20, Va. (116.5), and Fred C. Grontoft, Project Engineer, Food Machinery & Chemical Corp., Florida Division, Lakeland, Fla. (115.6).

Gulf Coast Booms

There are over 400 miles of Texas Gulf Coast, and long after the rest of the nation had snuggled down into its industrial and economic pattern, the Texas coast was still little more than a home for alligators, snakes and migratory waterfowl. A couple of wars, oil and a rising population have changed things considerably, and when Assistant Managing Editor John Morgan began assembling material for a cover story on the Texas Gulf Coast, he didn't know where to begin. There were so many delightful facts about metalworking he began to list them, until his astonished attention was caught by such items as: five-and-dime store pays $2000 a front inch for property; Houston and environs growing at the rate of 50,000 per year; 8000 air-conditioned autos sold in southeast Texas in 1953; metalworking products in short supply.

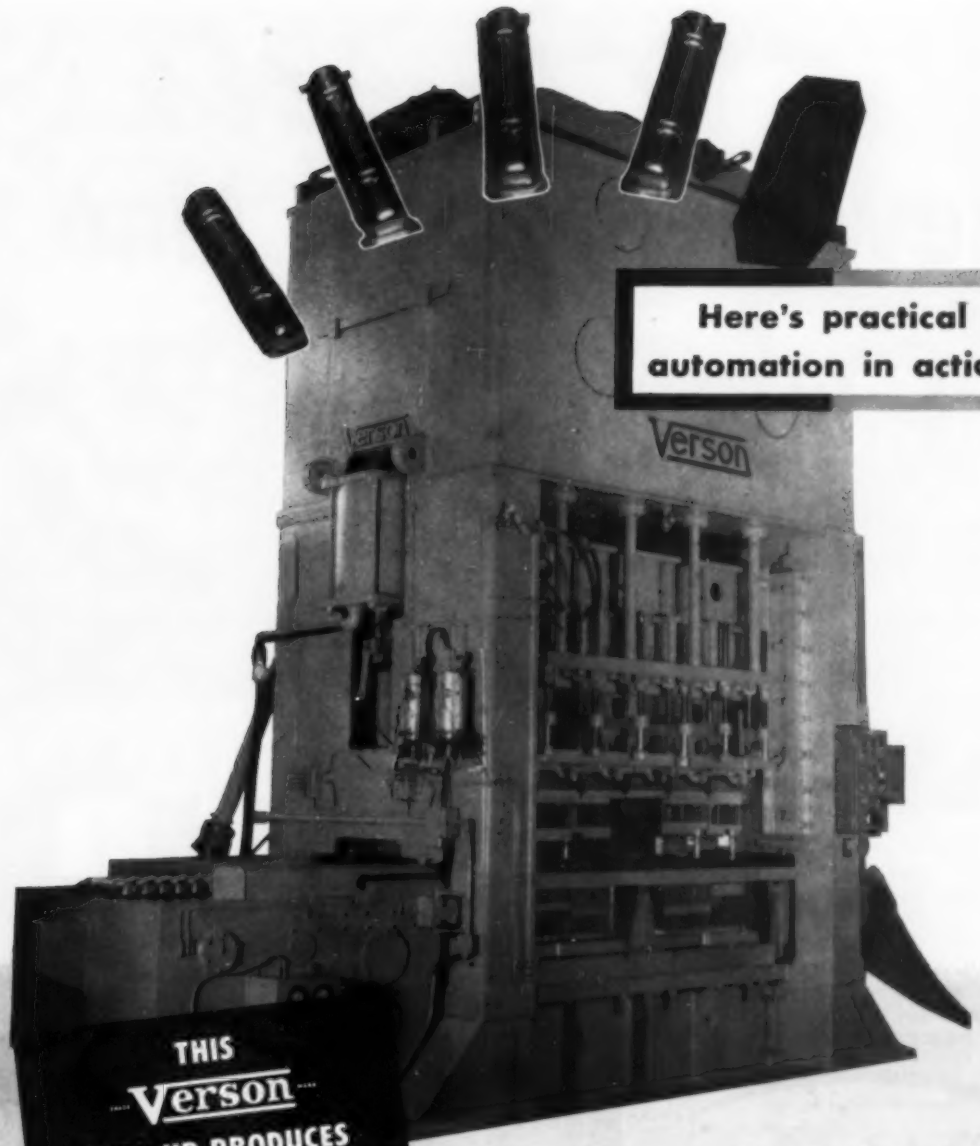
John concluded that if the folks down there had been bragging a lot, they had something worth bragging about. We recommend the article for your slow and thoughtful reading.

June Grads Slip

Ten years ago engineering graduates started at $193 per month, while those graduating five years later started at an average of $282. By January, 1954 the eager youngsters were worth $373, but the June crop of graduates could be hired for $10 less.

Shrdlu

(Metalworking Outlook—Page 27)



Consisting of a Verson Transmat Press and Verson Tooling, this is an outstanding example of automatic stamping possibilities where production requirements are high. The press is a 600 ton, 6 station Transmat in which stock is fed from a coil. Five operations on valve covers for overhead valve engines are performed automatically without intermediate handling.

If you mass produce stampings, investigate the economy of Transmat production. For specific recommendations, send an outline of your requirements or write for your copy of the Transmat brochure.

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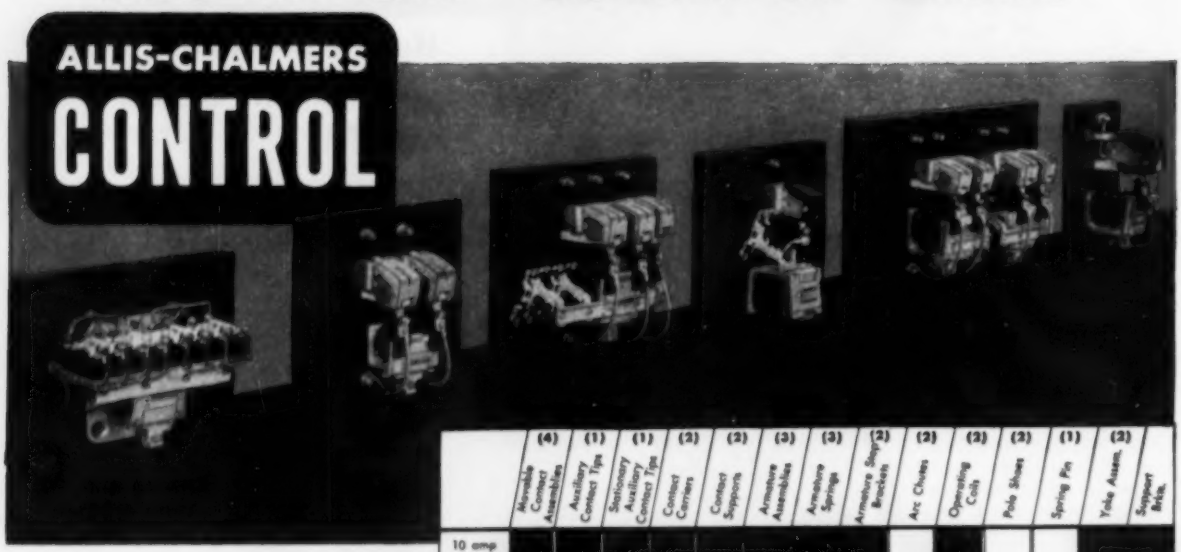

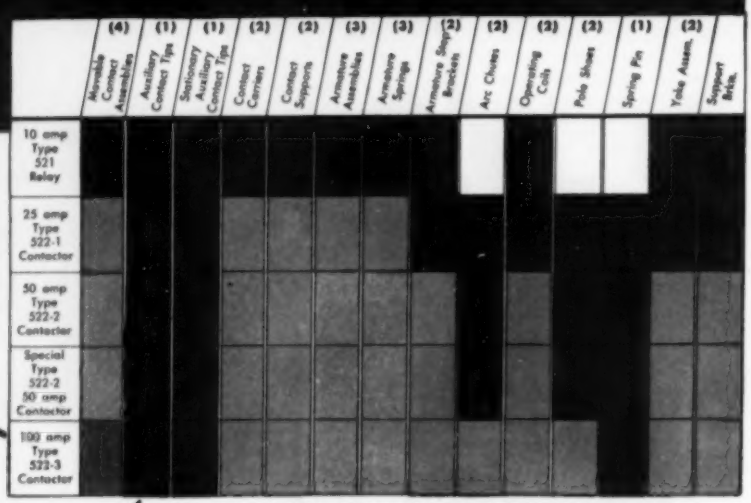

Change in color bar indicates size change. Number in parentheses tells how many sizes of that component are needed.

• This new line of general purpose, heavy-duty dc control starts with a multi-pole auxiliary relay and includes contactors ranging from 25 to 100 amps. The contactors are available in five basic units with optional arrangements of normally open and normally closed main and auxiliary contacts.

Outstanding Interchangeability of Parts Affords Maximum Convenience and Economy

This chart graphically illustrates the exceptional interchangeability of parts in this new control line. Maintenance is greatly simplified. Only a small inventory of parts is needed to keep these controls operative. The possibility of lengthy, costly "down" periods is practically eliminated.

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A-4448

New Bulletin — Bulletin 14B8171 gives data on the Allis-Chalmers dc line which now covers the *complete range up to 600 amperes.* See your local Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wis.

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LETTERS
TO THE EDITORS

Interesting Markings

I have read of a standard marking system for alloy steel which is being pushed by the Air Force. I would appreciate your advising where I might learn the details of this program.

J. R. Walgren
Tool Standards Department
Aluminum Co. of America
Pittsburgh

• *The best sources for information on the proposed marking system for alloy steels are: Office of Assistant Secretary of Defense (Supply & Logistics), Standardization Division, Washington 26; Business & Defense Services Administration, Iron & Steel Division, Washington 25; The American Iron & Steel Institute, New York.—ED.*

Vote of Approval

We would appreciate permission to reprint "Voting Machines: The Honest Count." (Today the voting machine is a familiar sight to politicians and voters alike . . . each machine contains more than 20,000 small parts.) It appeared on p. 50 of the Nov. 1 issue.

Raymond C. Anderson
Automatic Voting Machine Corp.
Jamestown, N. Y.

• *Permission granted.—ED.*

Homework

I have heard of your article, "Metals in the Jetomic Age" (Oct. 13, 1952, p. 148). Since I work at Ladish Forge Co., Cudahy, Wis., checking on all titanium forgings made on the third shift, I am reading up on metals to help me better my knowledge. Would you please send me a copy of article mentioned?

James Bowater
2751 S. Greeley St.
Milwaukee 7

• *Our supply is depleted, but we have two other reprints we believe will give you what you want: "Select the Right Materials" (Oct. 12, 1953, p. 129), and "Now You Can Use Titanium" (May and June issues, 1954).—ED.*

Our Slag Is Showing

OUCH! Your article on slag, "Construction Boom Spells Good Times for Slag," which appeared on p. 50 of the Nov. 8 issue, is a most interesting write up. But, oh, how it was botched when

(Please turn to page 12)

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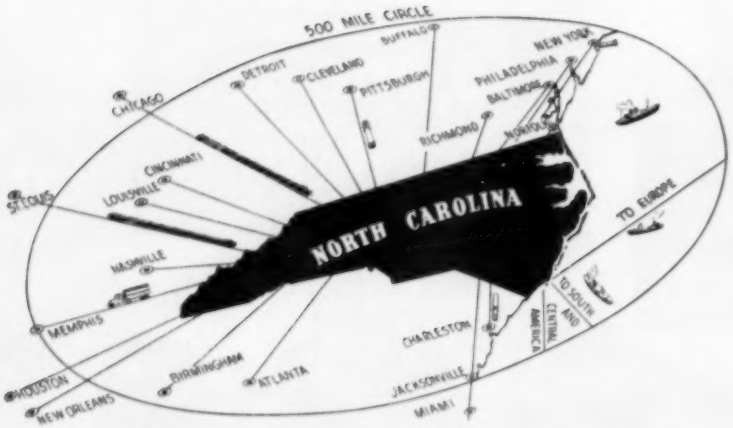

—two of the many long-range advantages to industries in *North Carolina*

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These and other important factors—power, water, transportation facilities, year 'round temperate climate—explain North Carolina's continuing industrial growth.

For a copy of the latest list of sites and buildings—urban and rural, in mountain, piedmont and coastal areas—write, wire or call Ben E. Douglas, Director, Department of Conservation and Development, Raleigh 10, North Carolina.

The 48-page booklet "NORTH CAROLINA STORY" describes the State's industrial diversity in a chapter "From Aircraft to Zippers". Write for a copy.

Friendly North Carolina
Where Industry Prospers

LETTERS

(Concluded from page 10)

using a photo of open-hearth slag so conspicuously.

In recent years we of the slag industry (blast-furnace slag), have been much concerned about the problem of open-hearth slag interfering with the established recognition which processors of blast-furnace slag have achieved for their commodity. The two types are not at all similar, especially for use as a mineral aggregate. We know of some serious results on construction jobs where open-hearth slag was employed for this purpose. Accordingly, we always emphasize the fact with users of the commodity that what we are recommending is only blast-furnace slag. You will note that the Bureau of Mines' analysis quoted in your article is definitely tied in with the blast-furnace type.

In view of the foregoing, I am sure that you can understand my reaction when I first noted the photo.

E. W. Bauman
managing director
National Slag Association
Washington

I hope you don't mind if I draw your attention to a mistake made in your article on slag. The use of slag for purposes as indicated by you concerns solely blast-furnace slag. However, your picture showed the overflow of open-hearth slag from a steel ladle. In the article itself, you head the second paragraph "Steel and Slag" instead of "Iron and Slag." The use for open-hearth slag so far in this country is limited . . .

E. H. Heckett
Heckett Engineering Inc.
Butler, Pa.

• *You're right. We stand corrected.—ED.*

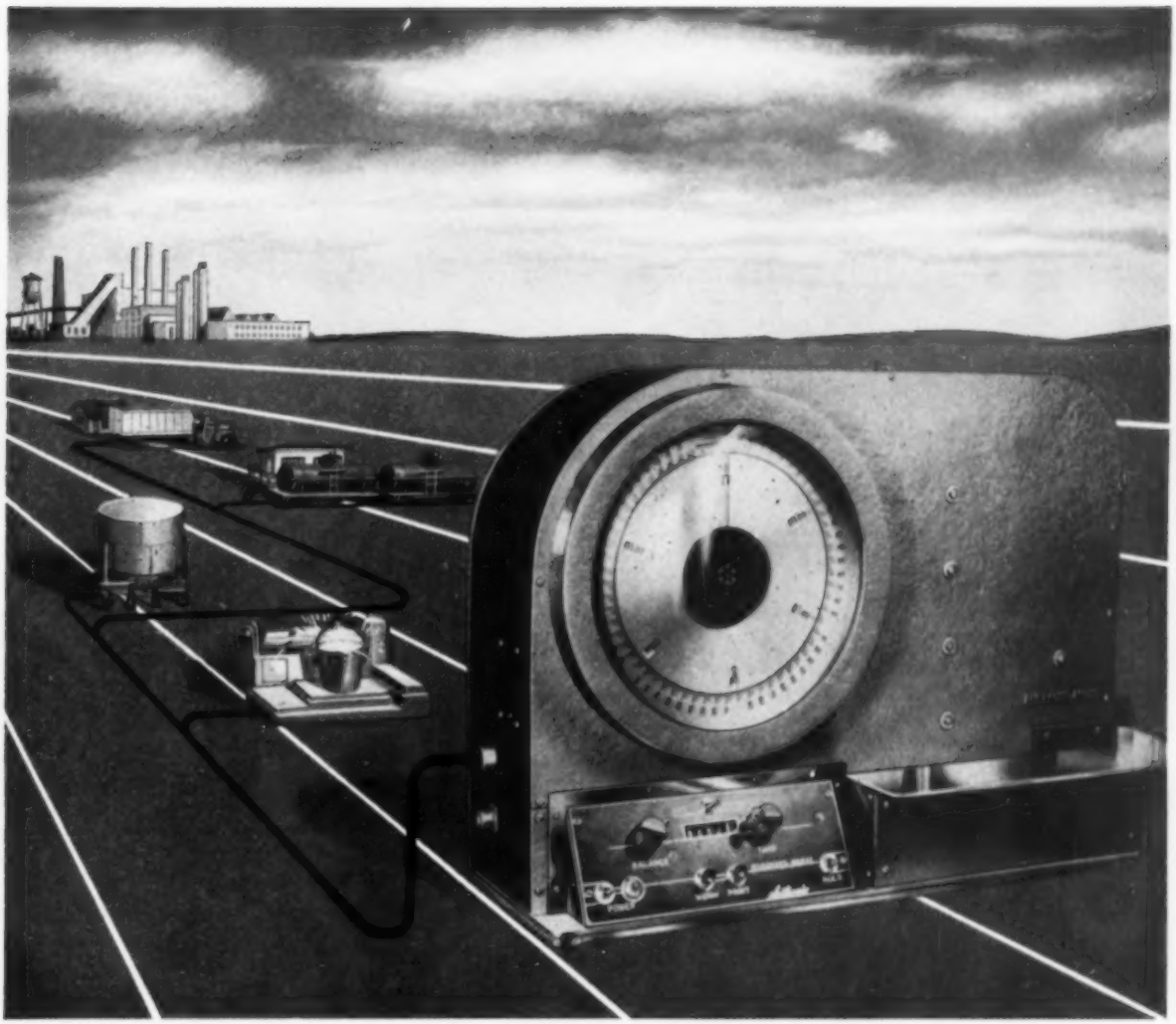
Steel Appetite Grows

A STUDY OF THE ECONOMIC GROWTH OF THE ARKANSAS RIVER BASIN IS BEING CONDUCTED BY THIS OFFICE. REQUEST AVAILABLE DATA PERTAINING TO IRON AND STEEL CONSUMPTION IN THE STATES OF ARKANSAS AND OKLAHOMA FOR THE YEARS OF 1939 AND 1954 OR NEAREST YEARS ON WHICH DATA IS AVAILABLE.

Brown, District Engineer
Little Rock District
Corps of Engineers
Little Rock, Ark.

• *Figures below are for carbon and alloy steels; figures for 1952 are the first half only but a good approximation for the whole of 1952 can be made by simply doubling the figures given. That year is the latest for which breakdowns were made by states.—ED.*

	Net Tons	
1947	*Carbon*	*Alloy-Stainless*
Arkansas	*16,396*	*n.a.*
Oklahoma	*198,684*	*10,704*
1952 (half)		
Arkansas	*13,029*	*47*
Oklahoma	*162,519*	*8573*



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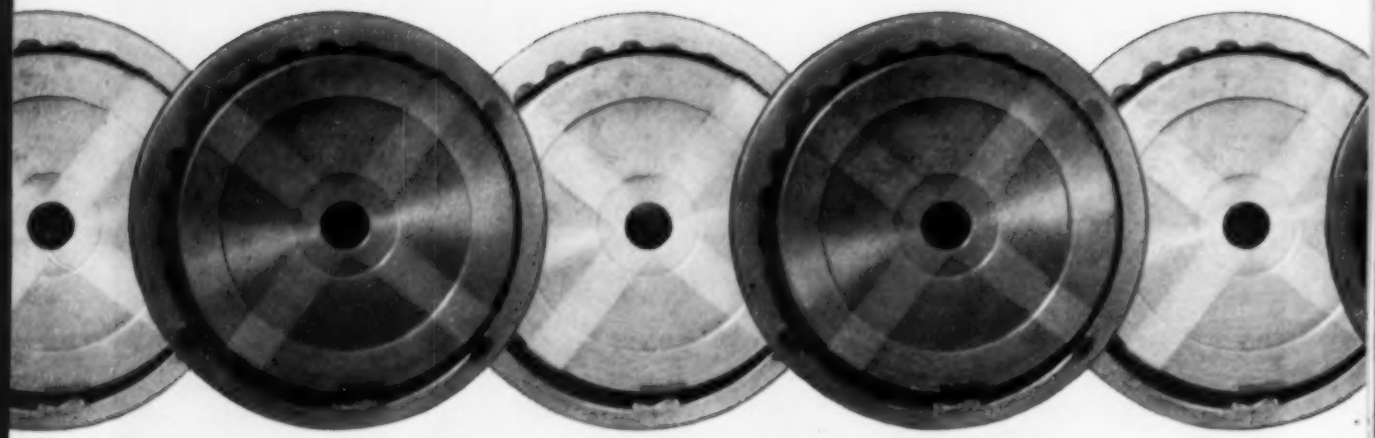
a name worth remembering when you want the best

SCALES • PUMPS • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • FARM MACHINERY • MAGNETOS



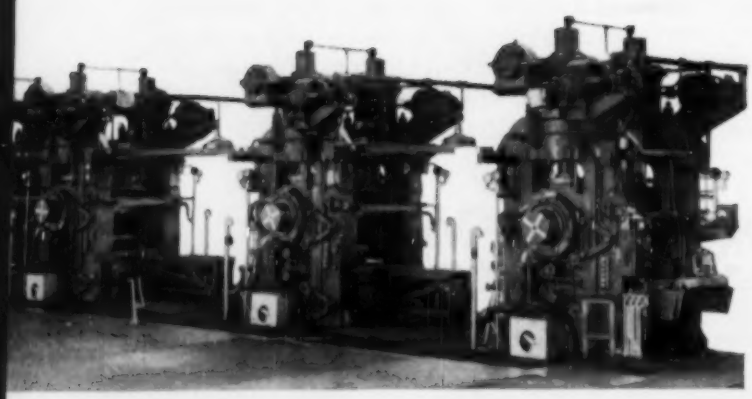
they just keep rolling along!

Oil changed only 3 times in 15 years

■ Here's the kind of a job where a lubricant either has to "put up" or get out.

Above and at right you see closeups of the tremendous bearings in the cold reducing mill of the Greer Steel Company, Anderson, Indiana. These are subjected to shock loads and continual extreme pressures. If there ever was an application where an oil has to prove itself beyond a question of a doubt this is it.

For the past fifteen years, STANOIL Industrial Oil #240 has been proving itself day in, day out by putting up the best lubrication possible on this tough job. *And yet, despite continuous hard operation, this oil has been changed only three times in this entire period!* The big bearings under continual heavy pressure have been successfully protected by STANOIL and have remained as good as new. Lubricant consumption has stayed low . . . with no evidence of *any* sludge or varnish formation. Periodic checks by the Standard Oil Lubrication specialist insure the continued like-new quality of the oil. That means that these vital mills will keep rolling along free from *any* lubrication difficulties.



Standard Oil lubrication specialist Don Wilson puts his training and experience to work to help Greer maintain economical, trouble-free operation. For help with *your* lubrication program call your nearest Standard office or write to Standard Oil, Chicago.

STANOIL

TRADE MARK

Industrial Oil

STANOIL Industrial Oils are versatile, multi-purpose oils designed to do a variety of jobs in a wide range of equipment. STANOIL can simplify stock, storage, and inventory in your plant by replacing many special-purpose oils you may now be using on air compressors, reduction gears, electric motors, auxiliary turbines and other equipment. For sure protection and better operating economy check today on the superiority of STANOIL.

STANDARD

STANDARD OIL COMPANY

(Indiana)

For stress, wear or vibration a

GRIPCO LOCK NUT

will hold tighter, wear longer, cost less!

The Gripco Lock Nut, with its simple, one-piece design, has given industry a tighter, more positive holding action for quicker fastener application at less initial cost. It provides frictional resistance to vibration and loosening torque — is faster to use — permits repeated removal and reapplication—simplifies production—lowers manufacturing and maintenance costs — has improved the durability of hundreds of products—and has insured greater customer satisfaction. If stress, wear or vibration is your problem, specify Gripco Lock Nuts for greater holding power. Impervious to oil or water. Write for samples and full details.

GRIPCO PRODUCTS INCLUDE:

Gripco Lock Nuts, New Gripco "Clinch" Nuts, Gripco Hi-Nuts, Gripco Pilot-Projection and Countersunk Weld Nuts with or without Gripco locking feature.

106

GRIP NUT COMPANY

"after 50 years still holding strong"

909-H S. MICHIGAN AVE., CHICAGO 4, ILL.

persistent hoarseness or cough

...is one of the seven commonest danger signals that *may* mean cancer...but should *always* mean a visit to your doctor.

The other six danger signals are —Any sore that does not heal ...A lump or thickening in the breast or elsewhere...Unusual bleeding or discharge...Any change in a wart or mole... Persistent indigestion or difficulty in swallowing...Any change in normal bowel habits.

For other facts about cancer that may some day save your life, phone the American Cancer Society office nearest you, or write to "Cancer"—in care of your local Post Office.

American Cancer Society

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THE WEEKLY MAGAZINE OF METALWORKING

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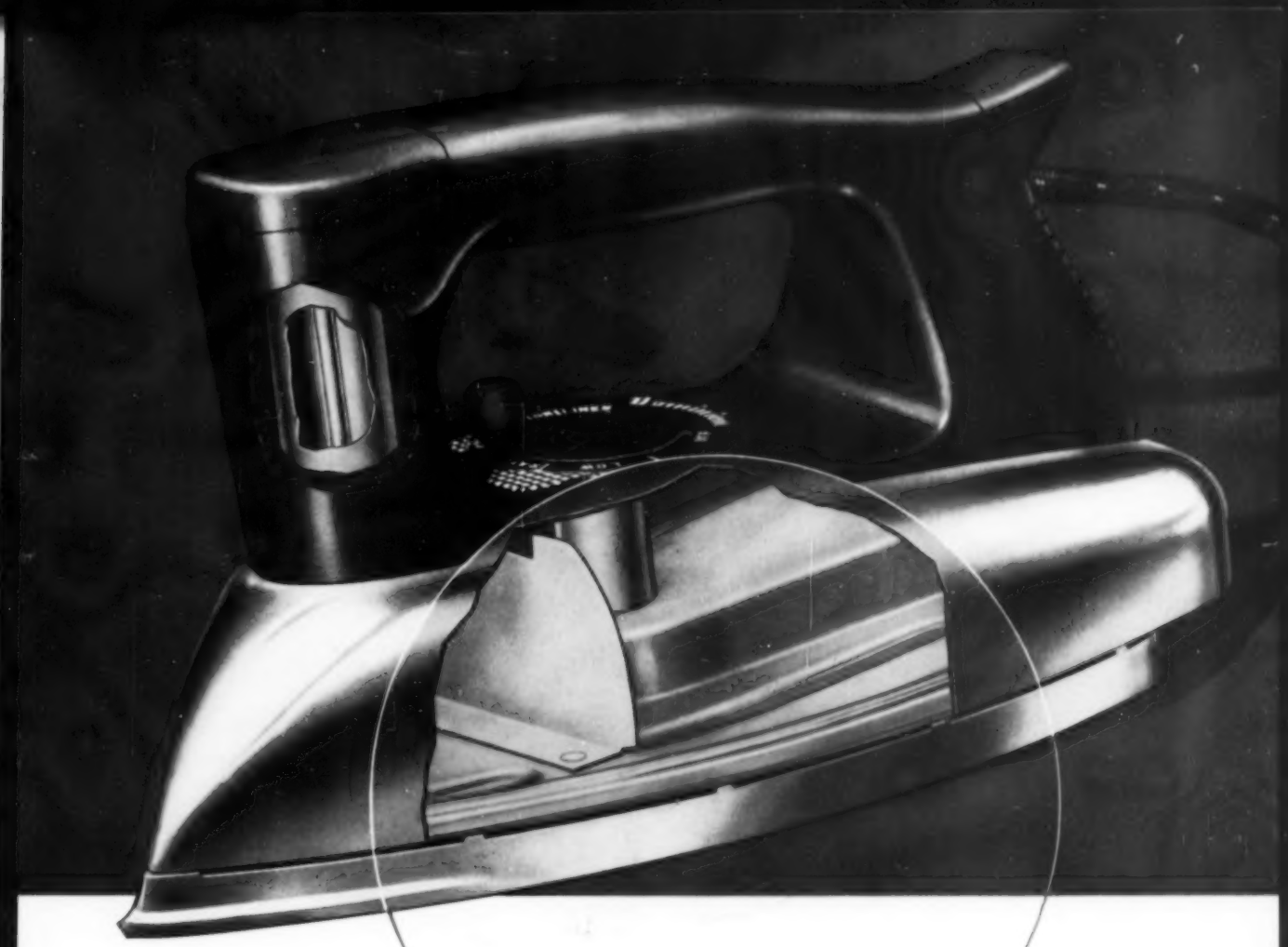


Peek under this gleaming chromium plate

and see functional, durable, BRASS at work

In adding a combination steam-and-dry iron to its list of electrical appliances, The Dominion Electric Corp., Mansfield, Ohio, set its goals high. The iron had to be engineered, styled and priced so as to be readily salable in a highly competitive market.

1 Costs *must* be kept down – without sacrificing quality.

2 The iron *must* be light in weight (actually 3¼ lb.) and provide a long service life.

3 It *must* operate unfailingly – anywhere – on ordinary, undistilled tap water.

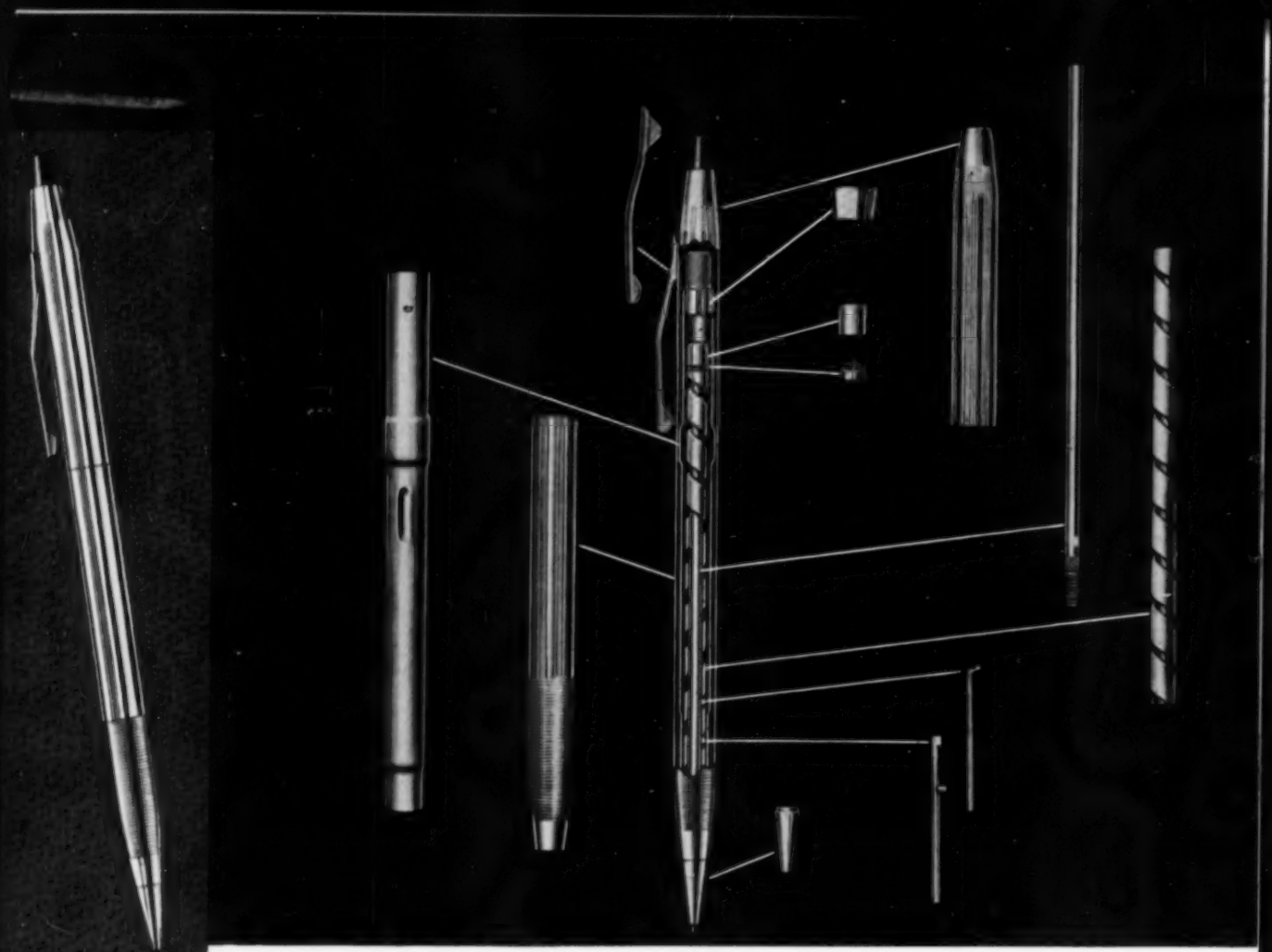
For the housing, steam generator, filler tube and miscellaneous supporting members, BRASS was the answer – as it so often is where freedom from rust, resistance to corrosion, workability and ease-of-finishing must be coupled with moderate cost.

We are glad to report that Dominion's choice and extensive use of Anaconda Brass paid off handsomely; also that we were able to give their engineering and production staffs an assist in selecting the right compositions and the most economical gages and tempers. Perhaps we can do the same for you? Simply write The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario. 5469

ANACONDA

the name to remember in

COPPER • BRASS • BRONZE



CROSS put an end to automatic pencil troubles **with BRASS**

Since 'way back in 1846, America's oldest manufacturer of fine writing instruments—the A. T. Cross Pencil Company, Providence, R. I.—found out that you can do things with brass that you can't do with any other metal. And they've been doing it ever since.

Illustrated above in actual size are an even dozen parts that make up the chromium plated Cross Pencil. All, except the spring clip of phosphor bronze, are made of brass supplied as sheet, strip, wire, rod or tube.

Note the multiplicity of fabricating operations—from the free cutting brass point to the strip-wound spiral—and you'll come to the conclusion that brass gives you the most "easy workability" for your money.

And the man who owns a Cross Pencil—or Pen—is far less apt to fume or fuss. He's got a writing instrument that's tops in quality at a moderate price, with parts that resist wear and corrosion . . . that won't rust, gall or "freeze."

Dependable brass is plentiful—and unrestricted. The days of substitutes are over. Next time the man at the drawing board looks up and says "What'll it be," say "Make it brass." Better yet, say "Anaconda Brass." The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

In the exploded view, above, is featured the pencil of the A. T. Cross Chromium Plated Pen and Pencil Set. All parts, including those in the pen, are made of Anaconda Alloys supplied by The American Brass Company since 1913. Cross also uses the same "inside working parts" in two "Century" Pen and Pencil Sets in which the caps, barrels and clips are available in either sterling silver or 1/20 12K gold-filled (illustrated above).

ANACONDA

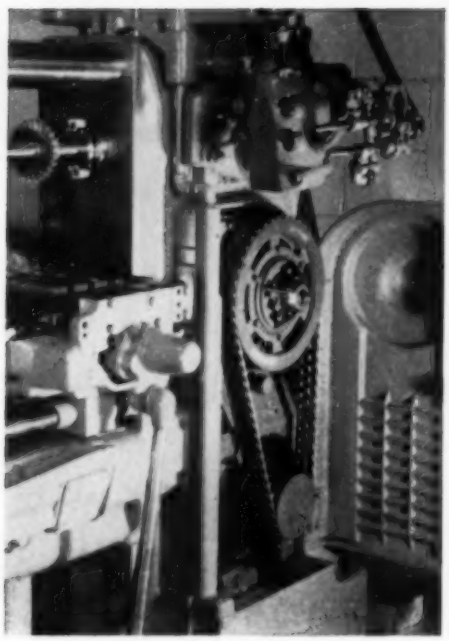
the name to remember in

COPPER • BRASS • BRONZE

Can Veelos V-Belts

CUT VIBRATION

20% to 90% in your machines?



MACHINE vibration is usually caused by one or more of these five factors: bearings; motor; clutch; sheaves; v-belts. Frequently, v-belts alone are the major cause of vibration.

Actual performance on many different types of machine tools has proved that Veelos v-belts can reduce vibration 20% to 90%.

Here's why this is so...

Regular v-belts have spots of varying density due to their construction. These spots, though not apparent, throw the belt out of balance when the drive is operating. Vibration is created which not only can cause excessive wear on parts of the machine but which may also damage the finished work.

Veelos v-belts have none of these spots. Every Veelos belt is perfectly balanced throughout its entire length. Every Veelos link and stud is absolutely uniform. The smooth, machine-cut sides and the laminated construction of the belt assure full, vibrationless power delivery.

These facts can be readily demonstrated with an electronic analyser. This analyser measures amplitude of vibration to as low as 2-millionths of an inch. A few minutes is all that is required to show you that Veelos runs smoother and creates less vibration than regular v-belts.

Drop us a line or clip the coupon for a demonstration.

Veelos is known as Veelink outside the United States.

Manheim Manufacturing & Belting Company
613 Manbel St., Manheim, Pa.

Yes, I would like a demonstration with the electronic analyser. Have your representative call me for a convenient time.

Name.....

Company.....

Address.....

.....

VEELOS
THE LINK
V-BELT

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

If you have a product that needs a push

Put the strength of STEEL

into your advertising program

138,000 Management, Production, Engineering and Purchasing executives in metalworking read it . . . use it . . . depend upon it!

Johns-Manville announces the development of new **SIL-O-CEL 16L** *Insulating Fire Brick . . .*

Lompoc, California, where Johns-Manville mines and processes diatomaceous silica insulating materials

Combines outstanding physical and thermal properties for furnace service to 1600F

Check these properties of SIL-O-CEL 16L

Maximum service temperature	1600F, back-up or exposed
Approximate density	33-35 lb per cu ft
Transverse strength	60 psi
Cold crushing strength	350 psi
Linear shrinkage	0.7 percent at 1600F
Reversible thermal expansion	less than 0.1 percent at 1600F
Thermal conductivity (Btu in. per sq ft per F per hr at indicated mean temperatures)	0.92 at 500F 1.07 at 1000F 1.22 at 1500F

1—has less than 0.1% reversible thermal expansion at 1600F

2—provides high load-bearing strength

3—for direct exposure or back-up service

Here is a new development of Johns-Manville insulation and refractory research. Its exceptional characteristics provide important savings in furnace construction. Made of diatomaceous silica, Sil-O-Cel* 16L Insulating Brick is light in weight . . . has low thermal conductivity . . . high structural strength. And where furnace linings are subjected to severe heat shock or where high load-bearing properties are needed, Sil-O-Cel 16L offers outstanding performance.

Sil-O-Cel 16L is now available. Samples will be sent on request. Also available without obligation is Booklet IN-115A, which describes Sil-O-Cel 16L and other J-M Insulating Brick and Insulating Fire Brick for service to 3000F. Write Johns-Manville, Box 60, New York 16, N.Y. In Canada, 199 Bay Street, Toronto 1, Ontario.

*Sil-O-Cel is a Johns-Manville registered trade mark

Replaces SIL-O-CEL Natural Brick

The development of Sil-O-Cel 16L Insulating Brick has resulted in the discontinuance of Sil-O-Cel Natural Brick. The outstanding properties of Sil-O-Cel 16L make it the ideal replacement for Sil-O-Cel Natural Brick for back-up use. In addition, the properties of Sil-O-Cel 16L Brick extend its use to exposed service applications.

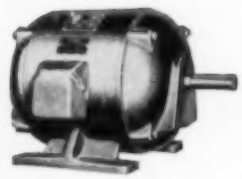
JM

Johns-Manville *FIRST IN* INSULATION

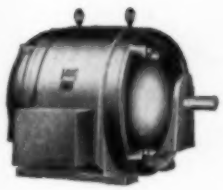
MATERIALS · ENGINEERING · APPLICATION

LIMA MEANS DEPENDABILITY *First*

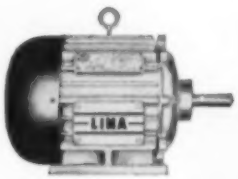
STANDARD AND SPECIAL INDUSTRIAL MOTORS . . . 1/3 TO 150 HORSEPOWER



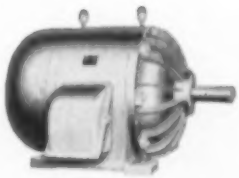
● DRIPPROOF
Type RS
Type TE (TENV)
Ratings: 1/3 to 7½ HP.
NEMA Frames: 66 to 254



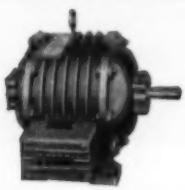
● DRIPPROOF
Type RS
Ratings: 3 to 150 HP.
NEMA Frames: 284 to 505



● TOTALLY ENCLOSED FAN-COOLED
Type E
Ratings: ¾ to 20 HP.
NEMA Frames: 224 to 326



● TOTALLY ENCLOSED FAN-COOLED
Type RE
Ratings: 10 to 100 HP.
NEMA Frames: 364 to 505

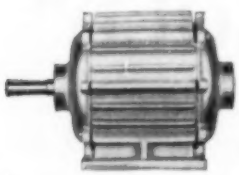


● EXPLOSION PROOF
TENV-TEFC
Ratings: ¾ to 20 HP.
NEMA Frames: 203 to 326
U.L. Approved for Classes I & II, Groups D, F & G.

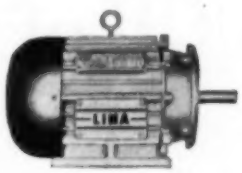
● VERTICAL MOTORS
Ratings: 1/3 to 20 HP.
NEMA Frames: 66 to 326, with or without feet and drip covers.
NEMA C or D endbell mountings.

● BRAKE MOTORS
Ratings: 1/3 to 125 HP.
NEMA Frames: 66 to 505
For applications that require quick stopping or holding.

● SHELL-TYPE MOTORS
Ratings: 1/3 to 15 HP.
Frames: 66 to 326
Ideally suited for building into O.E.M. grinders, headstocks, etc.



● FAN-DUTY MOTORS
Ratings: 1 to 20 HP.
Frames: 224 to 326
Air-over-motor construction with deep external fins, assures adequate cooling with reduced transverse section.



● FLANGE AND FACE MOUNTED MOTORS
Ratings: 1/3 to 20 HP.
NEMA Frames: 66 to 326
Flange or Face-type endbell furnished on shaft extension end for direct mounting. Supplied with or without feet.

In presenting its complete line of heavy-duty, squirrel-cage induction motors to industry, Lima has successfully combined the efforts of top engineering talent and skilled motor craftsmen, working with quality controlled materials to produce motors that have *built-in dependability.*

Ever increasing numbers of Original Equipment Manufacturers, quick to observe the reliable performance of these motors, are specifying LIMA for their products.

May we put a sample unit at your disposal?

For complete information . . . see your local Lima Representative listed in THOMAS' REGISTER, Mac RAE'S BLUE BOOK , CONOVER-MAST PURCHASING DIRECTORY, or write—

THE LIMA ELECTRIC MOTOR COMPANY, 5188 Findlay Road, Lima, Ohio

FIRST . . . FOR MOTORS . . . DRIVES . . . GRINDERS

For your swing frame grinding, Norton wheels take heavy pressures and high speeds in stride. Their fast, clean-cutting action and extra long life assure more metal through your cleaning room per man-hour.

For your bench and floor stand grinding, Norton wheels combine exceptional cutting qualities with consistent wheel economy in a way that makes your grinding look good and your costs look better.

For many other grinding jobs, use Norton Nylon-Reinforced Hub Wheels — BD rigid and BFR semi-flexible. For work ranging from notching risers to weld finishing, they're the lightest, easiest, safest wheels made.

NORTON
ABRASIVES

Making better products . . .
to make other products better

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

For your portable grinding, Norton wheels have the inbuilt balance that reduces vibration and bounce, and makes them "hug that work." Results are faster grinding, longer wheel life, less operator fatigue — advantages that show up in your profit column. Use Norton ALUNDUM* abrasive on steels and steel alloys, CRYSTOLON* abrasive on gray iron and nonferrous metals.

Brighten your rough grinding picture with this profit-boosting "TOUCH of GOLD"

Profits from grinding actually begin with the first, most basic grinding operation — snagging. Yet the profit-potentials of rough grinding are apt to be more neglected than any other.

In your own rough grinding, Norton wheels can help bring every job up to its proper money-making level. Because you can get Norton wheels that are exactly right — in abrasive, in bond and in every other detail — for best results on all your jobs.

For proof, test Norton wheels against any others, under the same conditions. Your operators will like their easy-handling, clean-cutting action. And *you'll* like the way they grind off more metal per dollar, turn out better work and increase your production — bringing the real, profit-boosting "Touch of Gold" to your rough grinding.

Your Norton Distributor

will gladly help you select the right wheels for your jobs and your machines. If necessary, he'll call your Norton Abrasive Engineer for expert advice on new or difficult applications. And with the world's broadest line to choose from, you'll get the wheels you need for better, lower cost grinding.

Booklet No. 1405 contains over 50 illustrated pages, with detailed information covering every phase of rough grinding — including *your* jobs. Get it from your Norton Distributor. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your classified phone directory. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass. W-1543

CALENDAR
OF MEETINGS

November 29-December 2, First International Automation Exposition: 244th Regiment Artillery Armory, New York. Information: Richard Rimbach, 845 Ridge Ave., Pittsburgh 12.

December 1-3, American Institute of Mining & Metallurgical Engineers: Electric furnace steel conference, William Penn hotel, Pittsburgh. Institute address: 29 W. 39th St., New York 18. Secretary: E. H. Robie.

December 1-3, National Association of Manufacturers: Annual meeting, Waldorf-Astoria, New York. Association address: 2 E. 48th St., New York. Secretary: Noel Sargent.

December 2-7, National Exposition of Power & Mechanical Engineering: Commercial Museum, Philadelphia. Information: International Exposition Co., 480 Lexington Ave., New York 17. Manager: E. K. Stevens.

December 5-7, National Association of Aluminum Distributors: Annual meeting, Boca Raton hotel and club, Boca Raton, Fla. Association address: 1900 Arch St., Philadelphia 3. Secretary: R. B. Wall.

December 5-9, Scientific Apparatus Makers Association: Fall meeting, Pinehurst hotel, Pinehurst, N. C. Association address: 20 N. Wacker Dr., Chicago. Executive vice president: Kenneth Andersen.

December 7-8, Society of the Plastics Industry Inc.: Plastics film, sheeting and coated fabrics division conference, Commodore hotel, New York. Society address: 67 W. 44th St., New York 36. Executive vice president: William T. Cruse.

December 12-15, American Institute of Chemical Engineers: Annual meeting, Hotel Statler, New York. Institute address: 120 E. 41st St., New York 17. Secretary: Stephen L. Tyler.

December 13-14, Material Handling Institute Inc.: Annual meeting, Statler hotel, New York. Institute address: 813 Clark Bldg., Pittsburgh 22. Managing director: R. Kennedy Hanson.

December 14-15, Industrial Truck Association: Annual meeting, Hotel Statler, New York. Association address: 526 Washington Loan & Trust Bldg., Washington 4. Secretary: William Van C. Brandt.

January 5-7, Institute of Scrap Iron & Steel Inc.: Annual convention, Saxony, San Souci, Sea Isle hotels, Miami Beach, Fla. Institute address: 1729 H St., N.W., Washington 6. Executive vice president: Edwin C. Barringer.

January 10-13, American Road Builders' Association: Annual meeting and exhibit, Roosevelt hotel, New Orleans. Association address: World Center Bldg., Washington 6. Executive vice president: Eugene Reybold.

January 10-14, Society of Automotive Engineers Inc.: Golden anniversary annual meeting, Sheraton-Cadillac and Statler hotels, Detroit. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

January 12, Aluminum Extruders Council: Winter meeting, Saxony hotel, Miami, Fla. Council address: 209 Washington St., Boston. Secretary: Phillip Lemelman.

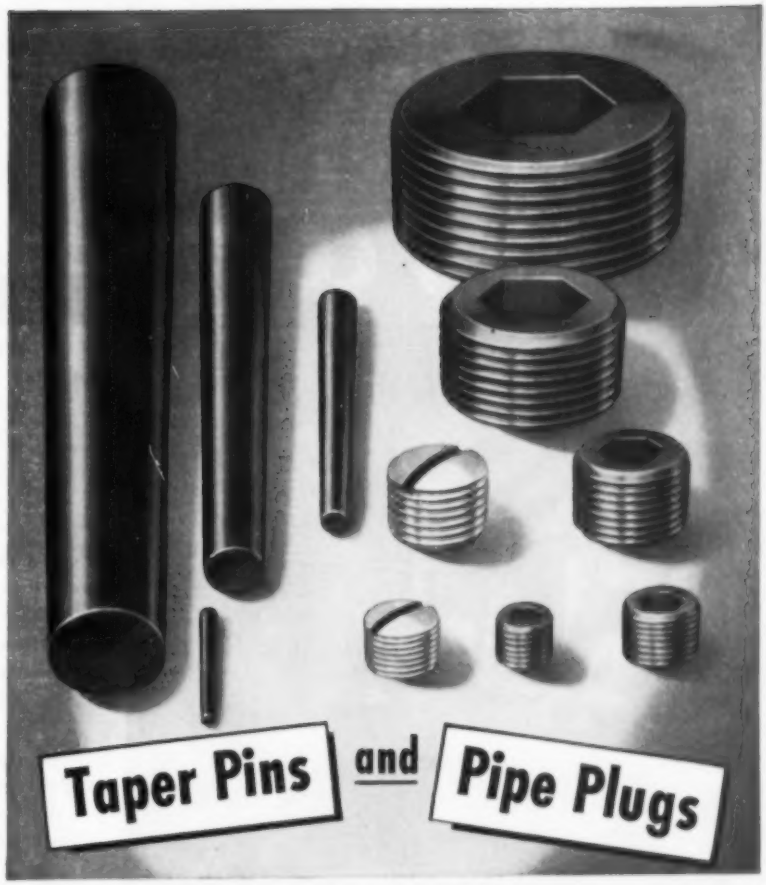
January 12-14, Southern Industrial Distributors Association: Midyear meeting, Edgewater Gulf hotel, Biloxi, Miss. Association address: 208 Peachtree Arcade, Atlanta 3. Secretary: Ted Pugh.

January 13, National Constructors Association: Annual meeting, Hotel Plaza, New York. Association address: 50 E. 41st St., New York 17. Secretary: C. B. Bronson.

January 14-15, Machinery & Allied Products Institute: Economic conference, Mayflower hotel, Washington. Institute address: 1200 18th St., N.W., Washington 6. Secretary: Charles W. Stewart.

January 18-20, Caster & Floor Truck Manufacturers Association: Annual meeting, New Weston hotel, New York. Association address: 27 E. Monroe St., Chicago 3. Executive secretary: Harry P. Dolan.

January 19-20, Steel Shipping Container Institute Inc.: Winter meeting, Hampshire House, New York. Institute address: 600 Fifth Ave., New York 20. Secretary: L. B. Miller.



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Higher Dues for Auto Workers?

The executive board of the United Auto Workers-CIO will ask the union convention in Cleveland next Mar. 27 to boost monthly dues from $2.50 to $7.50. The purpose: To build a strike fund of $25 million. If the convention approves the recommendation, it would take about three months from that date to reach the goal—just in time for the first major contract expiration. The agreement with General Motors Corp. ends May 29. The UAW strike fund is about $9 million now. After the $25-million goal is reached, dues would probably be reduced to the normal $2.50 a month.

Aluminum on the Road

New 1955 automobiles may use 22 lb of aluminum per car, compared to 11.4 lb in 1954 models. Kaiser Aluminum & Chemical Corp. makes that prediction, pointing out that the 1954 Chrysler Corp. line used an average 65 lb per vehicle. The average postwar car has used 2556 lb of steel, 521 of gray iron, 100 of malleable iron, 11 of aluminum and its alloys, 26 of copper, 16 of copper alloys, 30 of lead and its alloys, 66 of zinc and its alloys, 6 of chromium and small quantities of antimony, molybdenum, nickel, tin, tungsten and vanadium. Kaiser claims it is feasible to use some 470 lb of aluminum per car.

21,074 Suppliers for GM

As General Motors turned out its 50 millionth U.S. car last week, it revealed it's doing business with 21,074 independent suppliers in the country. That compares to 19,000 during World War II and some 12,000 before the war. About 50 cents of every dollar GM takes in from the sale of its products goes to them. Last year the corporation spent more than $5 billion for that purpose. Michigan has the most GM suppliers and vendors, 5680. Ohio is second with 3536; New York third, 2777; Illinois fourth, 2441; Pennsylvania fifth, 1052; and New Jersey sixth, 1026.

Mobilization: Well Along

Our defense mobilization is now "a long way toward achievement." The Senate-House Committee on Defense Production reports that more than $155 billion has been appropriated for military procurement and construction since Korea. Of that total, about $92.9 billion had been delivered as of last June 30. Estimated deliveries for the 12 months ending next June 30 are $21.7 billion. In stockpiling, objectives have been reached in 30 materials. But at less than 50 per cent of established goals are 18 materials, including ferroalloys, nickel, tantalum, selenium, titanium and strategic mica.

A Look at Titanium

Some 1200 tons of titanium products will be produced in 1954. Herbert L. Cullen, a metals expert with Business & Defense Services Administration, made that prediction before Sen. George W. Malone's subcommittee on strategic minerals and metals. Other witnesses testified that disappointing quality in some titanium was delaying the aircraft industry's large-scale

use of the metal. However, most agreed that rapid technological developments will solve problems of quality in "the foreseeable future."

Canned Merger Talk

Talk continues about consolidating a number of smaller canmakers, but action appears as far away as ever. Pacific Can Co., San Francisco, and National Can Co., Pittsburgh, linked in new rumors about a merger, say "there is no deal at the present." The can industry continues to push for new products to encase. The latest is wine. Continental Can Co. is producing a cone-top can like those now used for soft drinks for a product called Carina Kan-O-Wine. A wax lining protects the quality and flavor of the tokay, sherry, port, white port and muscatel.

The Market Triples

Americans currently spend at least $3 billion a year on major home improvements and modifications. The Census Bureau earlier estimated that the total was $1 billion, but a new pilot survey indicates that total is far too low. Here's a metalworking market that was thought sensational even when the spending was estimated at $1 billion. Now, it's three times as good.

More Profit Sharing

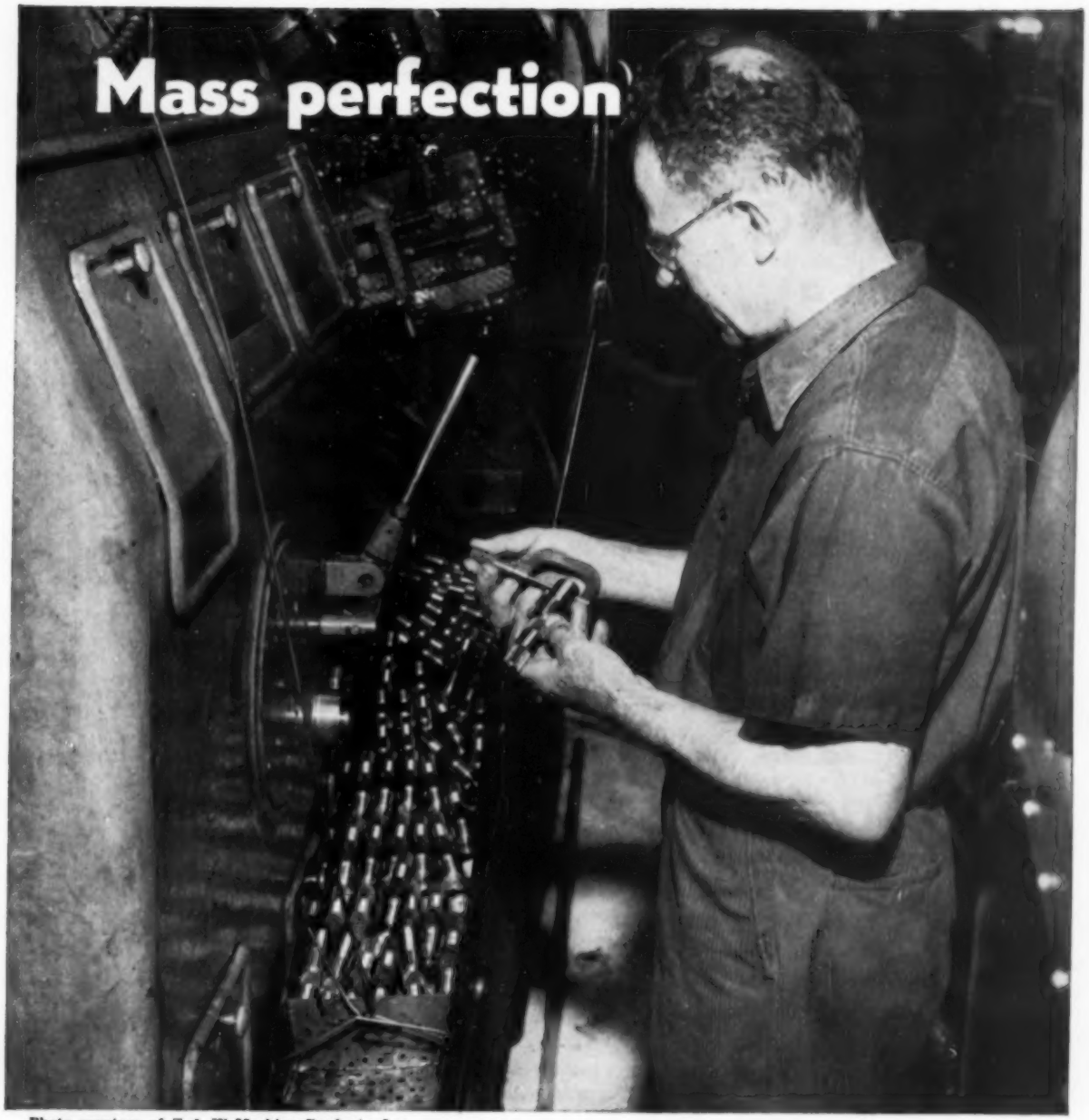
Nearly 8000 corporate profit-sharing plans today are on file with the Internal Revenue Service. A year ago there were 6000 and only 549 a decade ago. General Electric Co. dropped its plan in 1947, and a few other large firms have also abandoned theirs. That indicates that profit sharing apparently works best in smaller manufacturing operations.

Straws in the Wind

Youngstown Sheet & Tube Co. plans a $5-million revamping and modernization of its Campbell Works' cold strip department to boost its capacity and to enable it to handle larger coils . . . The Navy's Military Sea Transportation Service has placed four 18-knot tankers, three with Sun Shipbuilding & Dry Dock Co. and one with Ingalls Shipbuilding Corp. . . . Aluminum Co. of America expects a better foothold in the building industry with its colored aluminum finishes; its new Cincinnati sales office employs gold and blue aluminum exterior curtain walls . . . Employers who plead poverty in wage negotiations must substantiate their claim or face Taft-Hartley penalties, rules the National Labor Relations Board.

This Week in Metalworking

One million new jobs a year for the next two decades will mean more business for metalworking in providing the equipment for the new employees (p. 35) . . . The chemical industry is spending $2.7 billion on new construction (p. 36) . . . Airframe manufacturers, machine tool builders and government officials will meet Dec. 6-10 to nail down machine tool specifications (p. 37) . . . Scale makers give more weight to industry (p. 38) . . . How air conditioning makers weather the seasonal fluctuations (p. 40) . . . Jones & Lamson Machine Tool Co.'s H. A. Finch puts tomorrow in today's tools (p. 45) . . . Metalworking moves in on the Texas Gulf Coast (p. 46).



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What Is Wealth?

Wealth is more than money in the bank, stocks and bonds and a 1955 Cadillac. Fred Crawford of Thompson Products says it's a formula: Time turned into things creates wealth. He explained it this way to the Society of Industrial Realtors a few days ago:

Modern life requires many things—food, clothing and shelter and all the material paraphernalia of life. Raw material plus labor are the ingredients that make these things usable.

Raw material plus labor create wealth. But, in America nobody works hard in the grinding physical sense. So the word "labor" can be changed to "time." After all, factories contract for the time of a worker, and he is paid by time.

The formula then becomes: Raw material plus time create wealth. Of the two, time is by far the most important. A ton of coal is worth only a few cents in the ground but in your coal bin could be worth $20. The difference is a measure of the time spent in mining, preparing and transporting it.

Time is more important in another sense. Raw material obtained one day but not used is available for another day. Time, on the other hand is fleeting. Purchased one day, but not used, it is gone forever.

Time is the most costly but the most wasted thing on earth. Time turned into things creates wealth. But to most Americans, it is obvious that if time is turned into useful things slowly, less wealth results. If time is turned into things more rapidly, more wealth results. We call the rate at which we turn time into things "Productivity"—a much misunderstood word.

What has happened at Thompson helps clear the mystery. It had 200 workers when Mr. Crawford started 38 years ago. Since then, the company has been buying all the labor-saving machinery it could lay its hands on to get rid of those 200 workers. Yet, today, employment is 25,000.

It's an example of what has been taking place across the land to help the worker turn his hour of time into more useful things faster and contribute to a higher standard of living. America's secret of wealth is productivity.

Irwin H. Such

EDITOR

LOST RESOURCES: When you think of time lost, you think of strikes and you usually recall the big and dramatic walkouts when all or most of the auto or another industry has trouble. Almost unnoticed, except by the people involved, are the little labor disturbances that plague every major industry.

A case in point is steel. American Iron &

Steel Institute points out that during the third quarter steel companies had 66 work stoppages involving 14,233 workers directly and 1792 indirectly. A total of 233,914 man-hours were lost directly and 119,120 indirectly. Some 41 of the 66 stoppages were caused by disputes over work rules, 8 because of disciplinary reasons, 5 because of protests about safety and health conditions and 12 from various other causes.

The situation in steel is duplicated elsewhere. Here is an area in metalworking labor-management relations that needs more attention. Here human resources are being wasted that need not be lost.

UNTAPPED TALENT: A partial solution to the scientific manpower shortage is suggested by Dr. Alan T. Waterman, director, National Science Foundation. He told a House committee on education and labor: "We must not overlook the important group of potentially creative scientists who do not enter college."

Dr. Waterman estimates that more than half of our brainier high school graduates do not continue their formal education. He pinpoints lack of motivation as one of the problems: "Clearly," he said, "greater interest in science and mathematics could be stimulated by improved teaching (in high school)."

ANOTHER FRONTIER: Oil's not the only industry that's booming on the Texas Gulf Coast (p. 46). Metalworking in that area is bursting at the seams to supply the popping population and the growing oil, gas and chemical industries. A 1953 survey by the Houston Chamber of Commerce turned up 194 metalworking plants in a 45-county region on the coast. A survey by this publication's market research department shows 251 plants employing 20 or more were operating there in June this year.

Industrial gains have come basically from a chemical trinity of acids, hydrocarbons and fresh water found there. The chemical industry, for example, is currently putting its largest investment in construction projects in Texas (p. 36). During the last 12 months that industry has completed $227.4 million in construction projects in the state and will add another $344 million within the next three years.

Metalworking serves as the handmaiden to such developments. Its gains in other areas, notably the Midwest, have resulted from the presence of the industrial trinity of iron ore, coal and limestone. The industry's growth on the coast is different, but it's expansion just the same. Metalworking is finding another frontier in Texas.

CHAIN REACTION: From something U. S. Steel Corp.'s Chairman Benjamin F. Fairless said the other day, you can see why the steel production rate is regarded as such an important weathervane of business.

Every time the steel industry makes and sells a million tons of finished steel, some 5 million tons of freight must be hauled to and from the mills, he points out (p. 93).

If steel consumption next year equals that of this year, and it looks like it will, the steel industry will have to turn out 7.8 million more tons of finished steel in 1955 than it did in 1954, for this year inventories supplied 7.8 million tons for consumption. That means 40 million more tons of freight will roll in and out of steel mills in 1955 than in 1954.

Those 40 million tons of freight should help encourage the railroads to resume their steel buying and influence railroaders to order a new car, a refrigerator or something else made of steel. Even the butcher, the baker and the candlestick maker stand to gain. There's no visible end to the chain reaction set off by a rise in steel production.

BUILD IN DISPOSAL: Waste disposal is a production problem. It's not something to toss into the lap of your maintenance department after you're faced with a stiff state law or local ordinance. That's why the time to design treatment facilities is when the plant or an addition is still on the drawing board.

A good example of this technique's success is found in the article beginning on p. 68. When Buick put up its jet engine assembly plant at Willow Springs, Ill., it incorporated treatment facilities based on a realistic appraisal of type and volume of work to be done.

Maytag ran into an unfavorable local situation after a plating room accident dumped raw waste into a local stream at its Newton, Iowa, plant. Since a new plating department was in the works anyhow, the company was able to build in a top-notch treatment plant as well as provide for water reclamation.

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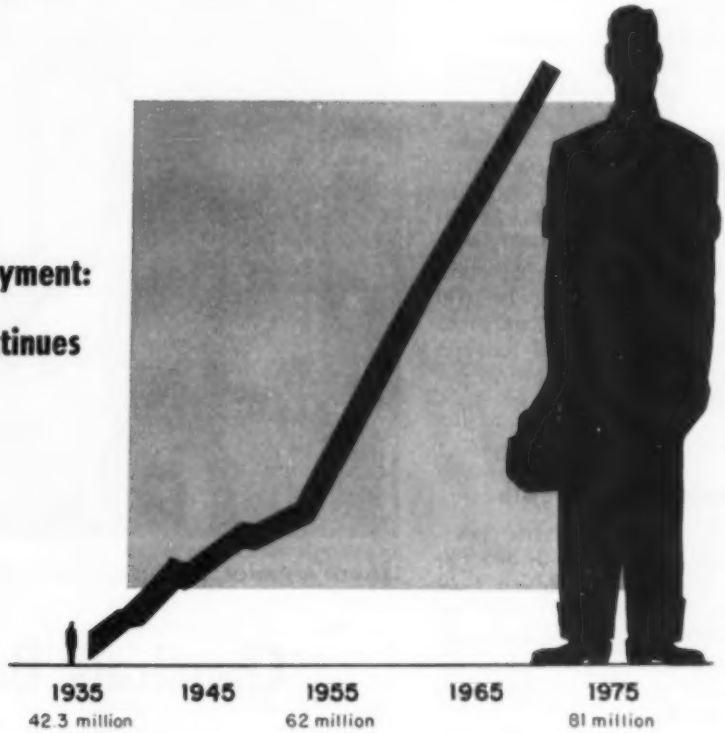
Total U.S. Employment: The Increase Continues



For Metalworking: More Jobs, More Business

"A MILLION JOBS a year will have to be created during the next 20 years as a result of population growth."

That's the conclusion of the U. S. Chamber of Commerce, based on a study, "Investment for Jobs." For metalworking — and capital equipment makers in particular— it's a big plus factor for the long-range business outlook.

The Growth — How realistic is such a projection? Take a look at the nation's employment growth chart above; since 1935 gains have averaged more than a million new jobs a year. Even the war years had little more effect on total employment than a normal growth year; chief impact of the war was in job concentration—manufacturing gained in employment while nonmanufacturing declined.

And a factor which makes the projection appear to be a conservative one is that in the next 20 years there will be an acceleration in the family formations rate. Babies bring business, but not so much business as when they grow up, marry and start their own families.

Market Prospects — New businesses and expansion of existing ones will be necessary to meet the increased demands for goods and services. Metalworking will play a major role in providing the equipment for this expansion.

The Chamber of Commerce estimates that about $13.3 billion a year in new capital will be needed to supply jobs for the 20,000-a-week addition to the labor force. In addition, other billions will be needed, the C of C asserts, to create jobs for workers in declining industries and for the million workers available each year for new assignments due to growth in industrial efficiency.

Greater Equipment Ratio — A major factor in this efficiency is the increasing emphasis on automation of production processes, a movement in which capital equipment makers can look forward to increasing markets. "In the next decade," says Dr. L. T. Rader, general manager of General Electric Co.'s specialty control department, "the ratio of plant equipment to land and buildings will increase from 2:1 to 4:1."

Having a bearing on the overall picture, too, is the growth in the number of businesses of the nation. Even with the past year's increase in mergers and expansion of individual companies, the number of businesses held its own over 1953. Business population

this year is about 4,185,300; last year it was 4,178,800; in 1946 it was 3,242,500.

Bigger Bite—Try to visualize a business that does not provide some sort of metalworking market.

Population growth alone promises high-level activity for metalworkers during the next 20 years —by then we'll be a nation of 200 million. But of equal significance is metalworking's increasing share of the nation's business. In 1940 metalworking's sales amounted to 23 per cent of the gross national product, in 1947 they were 26 per cent and last year they were nearly 35 per cent.

Quarter-century of Growth

The U. S. gross national product increased more than 300 per cent in the quarter-century from 1929 to 1953 ($104 billion vs. $365 billion), and the national income took similar giant steps upward over the same period ($88 billion vs. $305 billion).

Economic history of that 25-years is detailed in the "1954 National Income Supplement," available from the Superintendent of Documents or Commerce department field offices for $1.50.

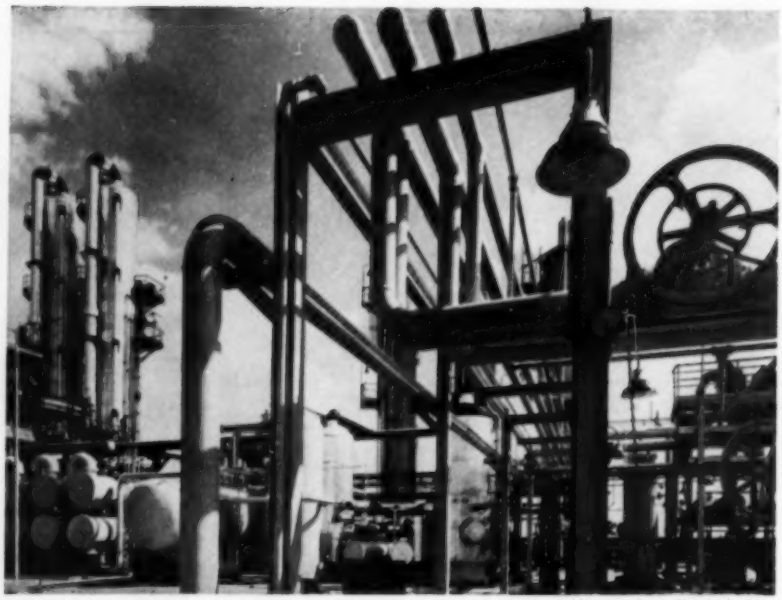
World's Largest Ore Body?

Southwestern Labrador "may have the world's largest single deposit of iron ore," says Joseph R. Smallwood, premier of Newfoundland. On the basis of exploratory work, that government's geologist has reported the deposit contains at least 1 billion tons.

It is being developed by Canadian Javelin Ltd., Montreal, Que. Cheapest known methods of washing are said to produce a 65 per cent shipping ore.

Canadian Javelin also has recently acquired iron mining properties in Chile. This source of "high grade Chilean lump ore" is described as necessary to assure the company of a balanced supply for open-hearth smelting of its Labrador iron ore.

The company has a stockpile of more than 100,000 tons in Chile and expects to ship about 500,000 gross tons in 1955. It will go to U.S., Japan, Great Britain, Europe.



National Petro-Chemicals Corp.

There's metal in this picture as . . .

Chemicals Brew Up a Boom

BIG NEW MARKETS for controls, process equipment and other metalworking products are being opened up by chemical industry expansion. A survey by the Manufacturing Chemists' Association shows that more than $1.2 billion has been spent by the industry on construction since last November. Another $1.5 billion bill will be racked up before the end of 1957.

Consolidated figures show the heaviest investment is being made in a wide general group of chemicals. Polymeric materials for plastics, agricultural chemicals and synthetic organic materials also rank high. Facilities for production of titanium, magnesium, zirconium and other metals will cost an estimated $154 million. More than $57 million is being spent for new research facilities. Other projects total $185 million.

Details—The MCA survey includes chemical facilities regardless of the main business of the builder. It takes into account the large investments being made by steel, paper, rubber and other companies.

Chemical construction projects were reported in 43 of the 48 states, with the South and Southwest showing the greatest expansion. Texas, Florida and Louisiana together are spending more than $1 billion.

The three West Coast states continued to grow as chemical centers, the survey showed, with 51 construction projects valued at an estimated $200.5 million reported. California led with 37 projects totaling $173.6 million.

The States Spend—Among the traditional leaders in chemical manufacture, Illinois ranked third nationally, adding 35 projects valued at an estimated $169.6 million. New Jersey and New York, historically ranked first and second, respectively, also added to their chemical facilities.

New Jersey showed an addition of an estimated $68.1 million involving 30 projects, while New York's 33 projects planned, under construction and completed represent an estimated value of $66.7 million.

Totals — The survey covered more than 570 privately financed projects, 215 of which were com-

pleted between Nov. 1, 1953, and Oct. 31, 1954. Some 219 projects are being built at an estimated total cost of $933 million, the survey showed, and another 138 projects, to be built at an estimated cost of $581 million, have been definitely committed.

Total dollar cost of projects completed this year, and those now under construction or planned, most of which will be completed within three years, is $2.7 billion. The MCA pointed out that many more projects have been announced as under consideration or in the planning stage.

Some $3.4 billion government-financed chemical construction is also under way or planned, most of it under contract with chemical companies.

Boost for Economy—"The expenditure of industry capital on building shown by this survey indicates a tremendous boost to our economy in payments for construction wages and materials," said William C. Foster, MCA president. "The survey appears to bear out the prediction that the chemical industry will quadruple its production capacity by 1975," he remarked.

Fast Blast for Jet Parts

Rice hulls and ground walnut shells are used to blast off surface dirt from parts of J47 jet engines returned for overhaul at General Electric Co.'s Evendale, O., plant. The mixture, which blasts from the gun at nearly 1000 miles an hour, does not have the harsh abrasive action of the sand which is ordinarily used

Horsetrading in Machine Tool Specs

Airframe makers and machine tool builders swapped ideas and hammered out proposed specifications for airframe tools. Results will help all concerned plan for the future

PROPOSED specifications for certain types of machine tools essential to the production of airframes will be acted on at a meeting of the Aircraft Industries Association in Washington Dec. 6-10.

Interested machine tool builders have been invited to be present. If approved by the aircraft and machine tool men, the proposed specifications, which were drawn up at the request of the Air Force, will be submitted to the Air Force for acceptance.

Give and Take — In nearly all cases, the specs were developed originally by AIA panels to include present and future design details desired by the airframe builders. Those specifications, in turn, were carefully analyzed by task groups of machine tool builders appointed by the Metalworking Equipment Division, Business & Defense Services Administration. The tool builders submitted counter proposals. The intention was to meet the demands of the aircraft industrymen, where possible, and to make tools economical to build and practical to operate at the same time.

Purposes of the proposed specifications are: 1. To permit the Air Force to plan more effectively for current procurement. 2. To permit the Air Force to allocate some of the available funds for reserve tool stockpiling on a basis that will assure greater mobilization utility. 3. To permit the BDSA more intelligently to plan in its further elephant tool studies. 4. "To lend greater significance to solutions that might be suggested to certain important component studies, such as heavy aluminum forgings."

Engines Ahead — The present program is concerned with machine tools used in production of airframes. A similar program is planned in connection with tools used in production of aircraft engines.

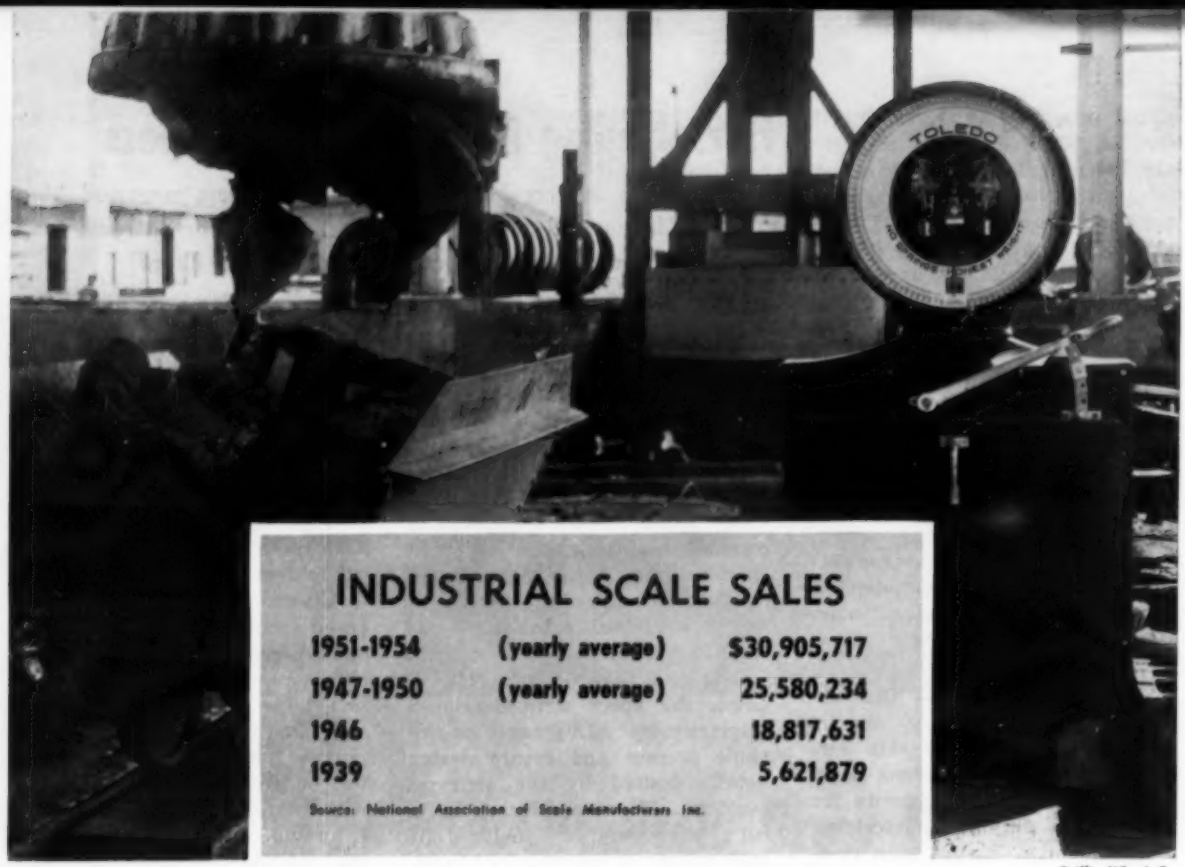
Included in the proposals to be considered at the December meeting is a family of profiling and contour milling machines regarded as essential to future aircraft production. It breaks down into roughing, precision finishing and precision rotary bed-type machines. There are small, medium and large machines for profiling through 360 degrees, which also have the ability to tilt, rotate and cut to depth.

Allowance for Versatility—Proposed specs for knee and bed-type specialized aircraft milling machines provide for small, medium and large horizontal units and small and medium vertical general purpose machines. They are for use on ferrous and light metals, with allowance, where necessary, to provide convertibility by allowing selection of alternate heads and other equipment.

Proposed specs for horizontal boring machines provide for 36 x 72-in. and 48 x 120-in. units, with separate models for ferrous and light metals. Table-type machines only are specified. Proposed specs for aircraft spar milling machines include two models, for work 24 and 36 in. wide.

Little Correlation—Various design features of aircraft skin milling machines have been approved by the task groups but with the caution that a machine embodying all these features would prove prohibitively expensive. Conclusions of the machine tool men were that: "The various aircraft manufacturers have thus far exhibited a wide diversity of uncorrelated buying habits . . . should war requirements arise, the manufacturers would want simpler, more highly productive units for their specific jobs."

These men recommended the Air Force seriously consider a "thoroughly studied procurement contract in which one or more tool builders might participate and arrive at a design approximating the desired degree of standardization of aircraft skin milling machines."



INDUSTRIAL SCALE SALES

1951-1954	(yearly average)	$30,905,717
1947-1950	(yearly average)	25,580,234
1946		18,817,631
1939		5,621,879

Source: National Association of Scale Manufacturers Inc.

Griffin Wheel Co.

Scales Gain Weight with Modern Industry

THE SCALE, man's most ancient measuring device, is doing many jobs industry hadn't even thought of a few years ago.

Owing to newer models and a keener appreciation of their versatility by industrymen, scales are controlling product quality, inventories and costs. And doing it cheaply, fast and reliably.

No Let Up—Despite the slow-up in industrial expansion this year, scale requirements have held up well. One large midwestern manufacturer of this equipment doubts if industrial requirements will be off more than 3 per cent in dollar volume this year and anticipates a good year in 1955.

Richardson Scale Co., Clifton, N. J., says: "We are just completing a good year. Much of our business has come from the trend toward automation in the bulk materials handling field. We expect this trend to continue and even accelerate. Next year we expect to be another good year."

Automation a Challenge—Says John Chatillon & Sons, New York: "1955 should prove to be another good year for the scale industry . . . automation will provide an additional impetus; the challenge will be met, the problem solved."

When and how did this renaissance in scales begin? Arthur Sanders, executive secretary, National Association of Scale Manufacturers Inc., Washington, points out: "During World War II, when it was necessary to conserve every possible man-hour while squeezing every ounce of production into every process, a trend began toward finding new uses for the versatile scale . . . the trend is continuing today and (see table above) is on the increase."

Weight on the Run — "Since everything that is produced or processed is weighed one or many times," Mr. Sanders continues, "trends are toward fast weighing, toward conveyor weighing on the move, toward 100 per cent checkweighing on continuous lines."

Toledo Scale Co., Toledo, O., observes: "There is an increased trend toward the automatic indication and recording of weights; and to the use of weighing principles for automatic testing and production controls."

How It's Used—"Many of the devices in the production group," says Toledo, "use electronic components in such applications as the automatic selection and classification of automotive connecting rods into several groups or in devices to add fixed percentages of an ingredient to units of variable weight."

Counting by weight is another

area that is gaining increased attention. Banks even use scales to checkweigh their money, and premium companies weigh the millions of coupons they receive.

Weighing Up — More than 60 manufacturers produce the various types of weighing equipment, including conveyor scales, continuous weigh feeders, automatic weighers and fillers, automatic batching scales, tank or hopper scales, crane scales and railroad track scales. Industry has a heavy load for them to bear.

No Dip in Tools, Dies

The tool and die industry can look forward to good business in 1955, perhaps equal to the peak year of 1953, says Jack Kleinoder, general manager, John Volkert Metal Stampings Inc., New York. Mr. Kleinoder told the Forecast Forum sponsored by the Central Connecticut Tool & Die Industries that this forecast rested on shop owners' efforts to get a share of this business with progressive management practices.

F. H. Wikstrom, vice president, Frank G. Wikstrom & Sons Inc., Brooklyn, N. Y., told the same meeting that he forecasts good business for 1955, too. Mr. Wikstrom believes manufacturers are finding they must spend more money on new tooling and special machinery to meet competition.

Two New Payment Plans

Two capital equipment makers have announced new financing plans: Gisholt Machine Co., Madison, Wis., has an extended payment plan to supplement leasing plans announced in April, 1954; Lewis - Shepard Products Inc., Watertown, Mass., has a new "6-Way Procurement Plan" (broad lease; time payment; short-term rental; outright purchase; truck trial plan; and trade-in program).

Says George H. Johnson, Gisholt president, concerning the trend to time payment plans: "On the whole it indicates a healthier climate for the machine tool industry . . . Users can now afford to keep production equipment up to date . . ."

Growth in the number and variety of time-payment plans makes Gisholt's bulletin, "What You Should Know About Buying and Renting Machine Tools," a useful piece of literature. Copies may be had from Gisholt for the asking.

A brochure describing the "6-Way Procurement Plan" of Lewis-Shepard may be had for the asking, too.

Purdy Co. salesmen make no false delivery promises. Their . . .

Scoreboard Tells the Inventory Story

PUT UP A SCOREBOARD, and your salesmen will know the score at all times.

That's what A. R. Purdy Co. Inc., Lyndhurst, N. J., did for its telephone-order salesmen, and efficiency bounced up about 50 per cent. There's no "hold the phone please" when you call in for an order of steel, aluminum or magnesium: At a glance the salesman can tell you whether the stock you want is available, what the cost will be and all other necessary information.

The Score—The glance by the salesman is at the huge inventory board, built in a semicircle in the order room. On the board are running inventories of Purdy's stocks in both its Lyndhurst and Syracuse, N. Y., warehouses. The big "scoreboard" also includes all points to which company trucks deliver and when such deliveries are made.

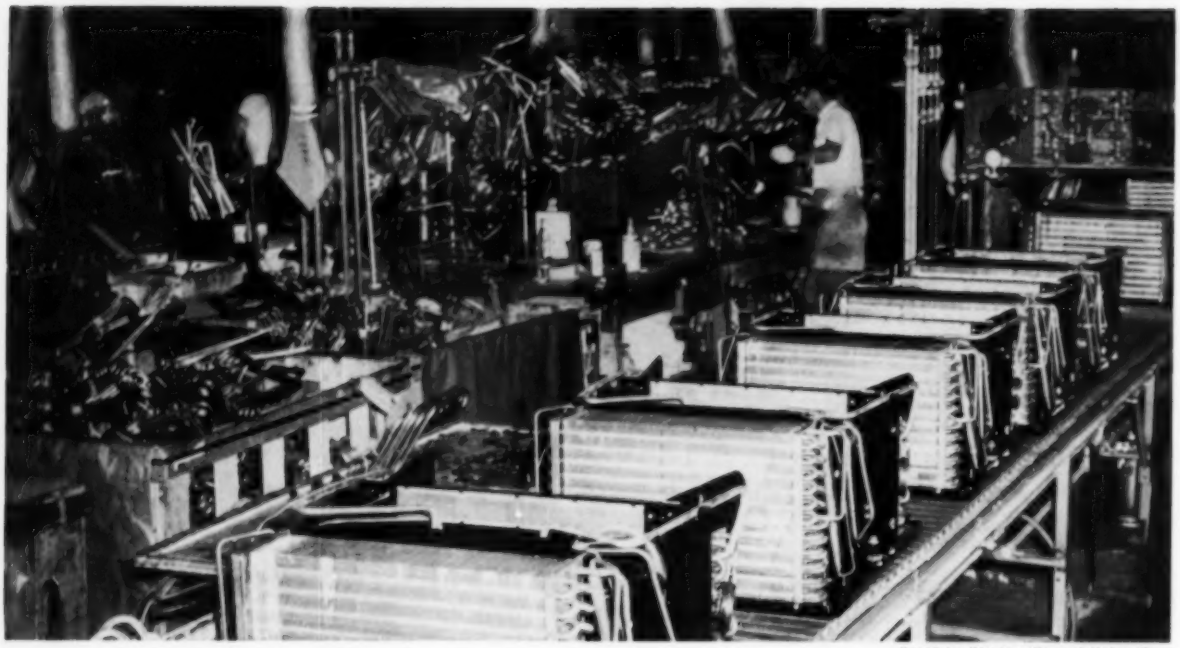
The moment a new order is written by one of the order clerks, a stock clerk deducts this quantity from the board.

No Lag—"We're not troubled with the usual lag between actual inventories and card records inherent in most card systems," officials point out. "Gone are the situations in which 24 to 36 hours after taking an order you discover the stock is exhausted and an embarrassed salesman has to call a customer back and give the 'sorry, we're temporarily out of stock' story."

Machine Tool Orders Slide

New orders for machine tools slid to about $44 million in October, 1954, compared with $53.3 million in September. Inquiries are still high, but firm orders are disappointing. Builders hope this means bookings will come in December or January instead of October or November.

National Machine Tool Builders' Association reports preliminary index of new orders is 148.9 for October against 180.9 in September. The shipment index stood at 190.9 against 213.4 in the preceding month and 348.4 a year ago, says NMTBA.



Frigidaire Division, General Motors Corp.

Room air conditioner output gets underway as . . .

Weather Makers Seek New Sales Fronts

Air-cooling markets tend to be seasonal so manufacturers must take special pains to spread production and employment. Diversification helps

AS MOST PEOPLE begin unlimbering skid chains and snow shovels, air conditioner manufacturers begin thinking about their January-through-April peak production period.

Some air conditioner firms, like Carrier Corp., produce pretty uniformly throughout the year, inventorying for the spring sales push. Others, like Cory Corp., start their production push earlier than the bulk of firms in the field, beginning in October or November. But most producers, like Fedders Corp., divert their production in the off-season to allied products in the refrigeration or appliance field, returning to air conditioning when the snow flies.

Production Hang-over — There's apprehension in this year's production, particularly in the hot room cooler field. A fairly cool summer, coupled with hot competition among the more than 100 brand names, left an inventory hang-over of about 500,000 units, despite respectable sales of 900,000 to 1 million units this year.

Although most firms see no drop off in sales next year (barring summer snows or an economic chill) about half of the estimated 1-million-unit output is already gathering dust on dealers' shelves. Implications are lower production schedules for many, probably a shakeout for the come-latelys. A price war is discounted by most, though some see it as a possibility.

Not Whole Story — Room air conditioners, however, are only a small part of the total market, emphasizes Cloud Wampler, Carrier Corp. president. For his firm they account for only 11 or 12 per cent of total volume. Although 80 per cent of room air conditioners are going into homes, a better solution to home air conditioning problem, Mr. Wampler believes, is the central conditioning system.

Preliminary estimates of home air conditioning installations this year indicate others share Mr. Wampler's view. About 75,000 central residential air conditioning units were installed this year compared with 50,000 in 1953. Mr. Wampler notes a considerable surge of installations during the fall months, heavy season for the replacement of heating plants. This could indicate the year-round air conditioning unit has invaded the furnace market.

Big and Growing—Also expanded is the market for self-contained equipment for commercial applications and so-called "big" air conditioners for office buildings and similar structures.

While the year ahead may be rough for some in the air condi-

tioning field, several firms report that intensive cost reduction, promotional activities and new product development programs will smooth the way. And over the longer term, they see a bright future, especially in central air conditioning for homes.

Super Generator for Detroit

Another "world's largest"—this time it's an Allis-Chalmers steam turbine-generator to be built for the River Rouge plant of Detroit Edison Co.

Allis-Chalmers Mfg. Co. says the new unit is one of the most economical ever designed. It will produce a kilowatt-hour of electricity on less than ¾ lb of coal. That consumption per kwhr is about 30 per cent less than the national average.

The unit will have a capacity of 300,000 kilowatts (400,000 horsepower) and be capable of supplying the electrical needs of an industrial city of one-half million people.

The high speed generator will be rated at 200,000 kilovolt-amps and will mark the first commercial application of supercharged hydrogen cooling to both stator and rotor conductors, according to Allis-Chalmers.

The initial temperature in the cross-compound turbine will be 1050 degrees F and reheat temperature 1000 degrees F.

Acquisitions Bring Joy to Joy

Joy Mfg. Co., Pittsburgh, has reasons to be happy with its diversification program. Three companies acquired by Joy since 1946 have returned after-tax profits two and one-half times the price Joy paid for them.

The three, Ladel Conveyor & Mfg. Co., Sullivan Machinery Co. and Mines Equipment Co., were bought for $8,662,317. Profits from date of acquisition to June 30, 1954, were $41,594,870 before taxes and $21,603,809 after taxes were settled.

J. D. A. Morrow, Joy's president, says future expansion or acquisitions "will be determined by whether such additions qualify as containing, unquestionably, the elements that will contribute to improved Joy earnings."

Harshaw Chemical Co.

As competition draws tighter . . .

Steel Strapping Business Improves

STEEL STRAPPING producers by year end will have bundled up a business volume equal to or slightly better than 1953's. Outlook for 1955: Even better, perhaps by 10 per cent.

Why the improved position when the general business level has declined? Steel strapping makers say competition has forced all industry to check its handling costs: This has led to wider use of steel strapping.

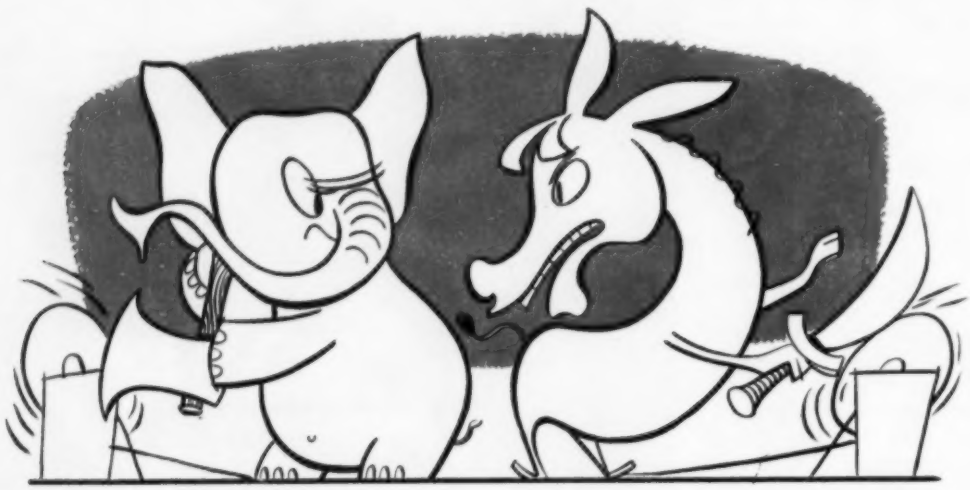
The Industry — For about 15 companies, steel strapping is a major business—about a third produce or process their own. Many manufacture and most lease the tools and equipment for its application.

Two other business - boosting factors, say strapping officials, are the introduction of power-operated strapping application equipment and the increasing use of cold-rolled, high-carbon heat treated flat strapping in larger sizes. Both have contributed to strapping's use in larger, heavier shipping jobs.

The Markets — Most of the strapping, however, is flat strip or round wire—both low carbon. Major markets include autos, appliances, textiles, chemicals, railroads, lumber, paper, steel and nonferrous metals. The top 15 per cent of the market consumes 80 per cent of the product. Consumption this year is estimated at 300,000 tons.

"Competition's sure to boost our business again next year," predicts one Midwest producer. "This, plus further developments expected in automatic application equipment, should boost our sales to nearly 330,000 tons in 1955."

By E. C. KREUTZBERG Washington Editor



84th Congress: Skirmishes Before the Battle

WHATEVER HAPPENS in the 84th Congress, this much is certain: Accomplishments will be overshadowed by the jockeying between Democrats and Republicans for positions in the 1956 presidential election race.

For metalworking management —and other businessmen—the political maneuvering is of vital concern. Some of the inequities to business that the Eisenhower administration corrected may be revoked. Flashing the warning are statements by key Texas Democrats: Sam Rayburn, next speaker of the House, and Lyndon Johnson, next Senate majority leader.

Says Mr. Rayburn: "We'll make a tax bill that will be fair to all. We shall be for a strong foreign policy, and we'll try to make it nonpartisan. We feel we should have a strong national defense as we had when the Democrats were in."

On the Agenda—Democratic objectives are these, says Mr. Johnson:

1. A gigantic development program of natural resources, including huge reclamation and conservation projects to open the great stretches of the West.

2. Revision of the Atomic Energy Act to strengthen the safeguards against monopoly and a thorough ventilation of the Dixon-Yates contract.

3. Improvements in the labor law that will permit management and labor to operate with the dignity to which each is entitled.

4. To attack the economic problems of our country and try to unleash the forces that will bring us to greater heights of prosperity without permitting a "payoff of a shirttailfull of campaign contributors."

What'll Really Happen—Here's what the Democrats are actually out to do, warn Republican leaders:

1. Repeal or emasculate the Taft-Hartley Act.

2. Eliminate present limited relief on double taxation of dividends.

3. Tighten the compulsory patent provision in the atomic law.

4. Legislate the federal government as the guarantor of full employment.

5. Expand and strengthen the public power program.

It's almost a certainty, too, that the Democrats will launch an anti-monopoly-antimerger drive which will put business in the hot seat.

Ike's Role — Top Republicans are hoping that President Eisenhower will get into the act. They believe he can help stem the tide by coming out for some popular public cause like an all-out drive against unemployment. His January speech could be important.

Plea for Industrial Radio

The Committee on Manufacturers' Radio Use, National Association of Manufacturers, has petitioned the Federal Communications Commission to change a proposed order which revises rules on Special Industrial Radio Services.

Under it, manufacturers in metropolitan areas of more than 500,000 population could use mobile equipment to communicate outside their yard areas under certain conditions. The NAM wants limiting conditions defined more clearly. Such communication is desired only in connection with production operations. The committee also asks the FCC to delete that part of the proposed order which would reduce from five to four the number of frequencies available for manufacturers' radio use.

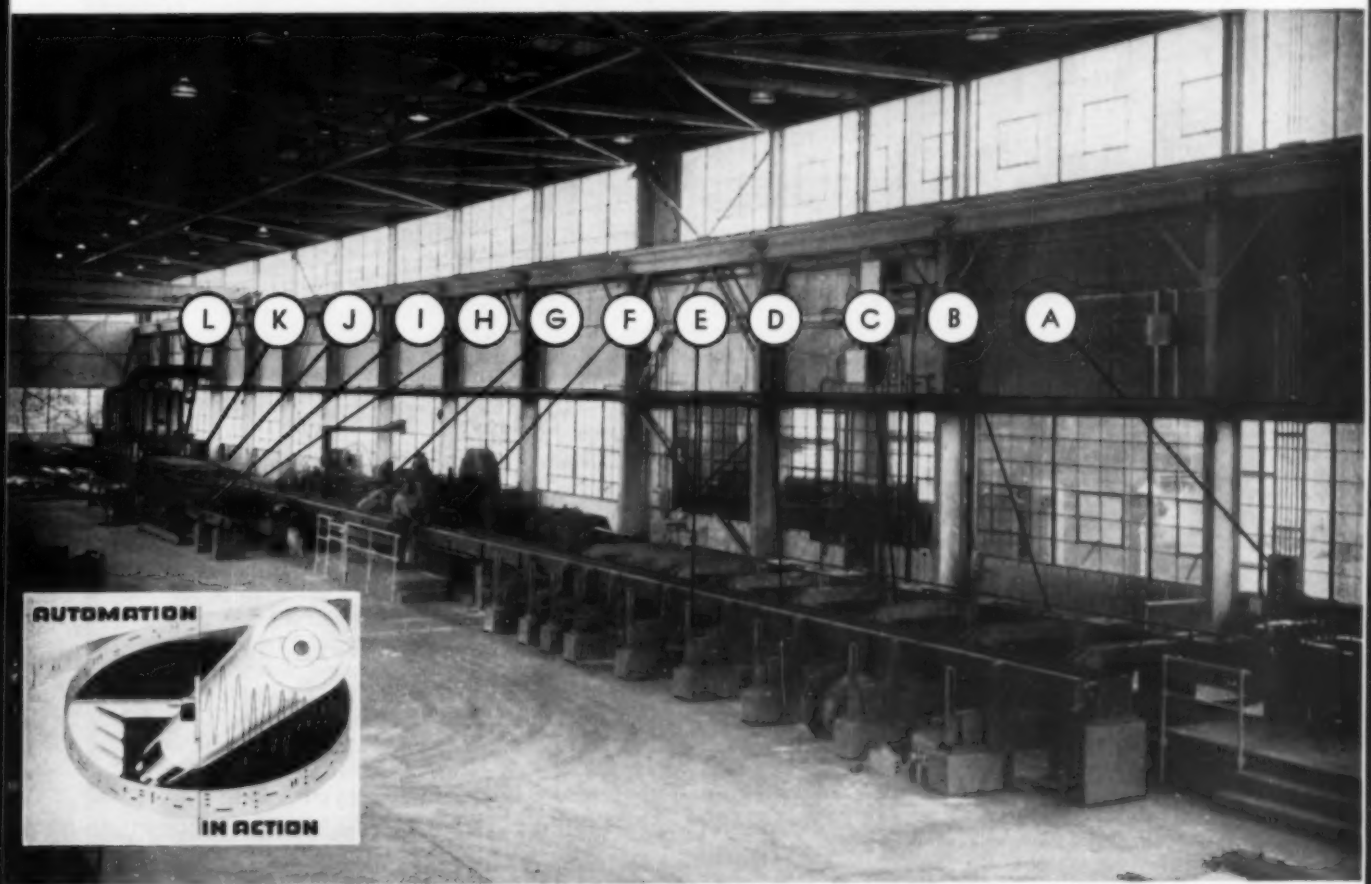
Here's the Fastest, Most Efficient Cold Draw Processing Line Available

The McKay Automated Line that automatically handles and processes hot rolled bars through cold drawing, shearing and straightening in a continuous cycle has proved itself to be far and away the fastest, most efficient cold draw processing operation in action today. Users are finding they can effect great labor savings while actually boosting production, and at the same time get a more uniform product.

Hot rolled, pickled bars are push pointed, drawn, sheared to length, and straightened in a single, continuous operation with no intermediate handling of any type. Hold down and crop gauging on a multiple shear, plus automatic length gauging, permits the shearing operation to keep pace with the maximum drawing cycle. Sheared bars are automatically entered into the straightener which operates at speeds high enough to enable a continuous straight-line flow of bars.

Does the line pay off? Three of four companies now using these lines say they have already paid for themselves and are contemplating the purchase of additional units.

CAN YOU AFFORD TO OPERATE WITHOUT SUCH COST SAVING EQUIPMENT? Remember handling adds nothing to the value of your product. Why not look over the McKay line of automated processing-handling equipment? Why not talk it over with a McKay engineer? There's no obligation.



A—**Hydraulic Push Pointer.** Eliminates pointing prior to drawing. Minimizes point scrap.

B—**Multiple Bar Draw Bench.** One, two or three bars at a time.

C—**Horizontal Pneumatic Transfer Arms.** Takes drawn bars from bench and deposits them on driven shear entry table.

D—**Shear Entry Table.** Conveys drawn bars to the shear.

E—**Auxiliary Racks.**

F—**Multiple Bar Shear.** Has capacity to shear same number and sizes of bars that are drawn.

G—**Cut-to-Length Gauge Table.** Automatic cut-to-length and crop gauges.

H—**Shear Run-out Table.** Driven table conveys sheared bars to straightener entry table.

I—**Transfer Skids.** Entry to straightener table.

J—**Automatic Straightener Entry Table.** Completely automatic feed from transfer skids into straightener.

K—**Straightener.**

L—**Straightener Exit Table and Racks.**

The McKAY MACHINE Company
YOUNGSTOWN, OHIO

McK

ENGINEERS AND DESIGNERS OF EQUIPMENT FOR THE AUTOMOTIVE, FABRICATING AND STEEL INDUSTRIES

A.W.
CONTINUOUS MILL

PLATE • SHEET • STRIP—*available in hot rolled quality*

This new pickle line is a good example of the modern equipment used by Alan Wood in producing the highest possible steel quality.

Precision equipment such as this, and our policy of mine-to-mill undivided responsibility are your guarantee of always getting exactly what you want. The Alan Wood Continuous Mill produces steel from .059″ to .500″ to a maximum width 25½ inches, and is available in coils or cut lengths.

Our Eastern location, close to transportation, also means faster delivery . . . and often lower freight rates.

More than a century and a quarter of iron and steel making experience

ALAN WOOD STEEL COMPANY

CONSHOHOCKEN, PA.

H. A. Finch Puts Tomorrow in Today's Tools

"OUR JOB is to take as much of the guesswork as possible out of machine tool sales . . . give the customer what he wants . . . not just what we think he ought to have.

"We try to use tomorrow's trends in the products we're working with today. To do this we must find out what machine tool users are looking for in new equipment. Then all we have to do is design and produce around their ideas, using our experience and know-how."

That's the way Howard A. Finch, marketing manager, Jones & Lamson Machine Co., Springfield, Vt., sums up his approach to an increasingly important job: Getting the right product to the right customer at the right time. J & L's management attitude on the importance of this job is evidenced by its reorganization at the first of this year. Although the company was split into three divisions—one for machine tools, one for die heads and another for optical comparators—Mr. Finch works with all three.

Separates—Reason for the subdivision: Each of the three basic products is sold differently, made differently, has a different set of users, requires different advertising techniques, etc.

Out of this heterogeneous group comes the common problem of promoting J & L products and the company itself. Mr. Finch's job embraces sales, market research and analysis, advertising, public relations, etc.

By Chance—Mr. Finch's first job at J & L came about as a result of one of his hobbies. For years he has been spending part of his free time navigating racing sail boats.

Sitting in the Springfield, Vt., hotel one evening during World War II, Mr. Finch, then in machine tool procurement for a large defense plant, overheard a conversation about a new navigating device which did away with complicated mathematics. Getting into the conversation, he found it was to be developed by J & L. and he wound up with a job on the project.

While the project eventually folded, Mr. Finch stayed on, working for a time in the shop before moving up through the sales department to his present position.

Although the days of big-scale yacht racing are over, his other hobbies take care of what little free time he has. They include photography, flying, hunting and the Austin-Healy he uses to navigate the mountain roads in his home state.

All photographs, Houston Chamber of Commerce

Metalworking Moves in on the Texas Coast

The rising population and booming oil, gas and chemical industries create big new demands for metal products. Many observers think this is only the beginning of still more gains

IN 1920 J. S. Abercrombie, a Houston oil man, wanted a device to prevent blowouts in oil wells. It was developed, and a company that eventually became Cameron Iron Works Inc. was formed to make it for the local oil industry.

That's how a lot of metalworking companies got their start on the Texas Gulf Coast. But, today, new companies are springing up more frequently and growing more rapidly than they did in the 1920s. Oil is still dominant, but there's more of it and other natural resources to boot. Natural gas, once a nuisance, requires equipment for its processing and pipe for its transportation. A surging chemical industry, based on petrochemicals and other elements in the region, such as sulphur, is pulling in still more metalworking plants.

The Figures—A 1953 survey by the Houston Chamber of Commerce of 45 counties in a 100-mile-wide strip on the Texas coast received replies from 111 fabricated metals plants, 53 oil tool facilities, 22 foundries and 8 primary metals plants. The 194 plants represented a total investment of $310.5 million, had annual sales of $659.7 million, employed 34,864 and had an average annual payroll of $139.1 million.

A total expansion of $5.3 million was under way at the 194 facilities in 1952-54. A STEEL market research survey indicates that last June 251 metalworking plants employing 20 or more operated in the 45 counties, 173 around Houston.

Why? — What's behind this growth? Basically, it's raw materials and geography. Within a 200-mile radius of Houston more wealth is taken from the soil than from any equivalent area on the globe. Coupled with that are seven important ports — Brownsville, Corpus Christi, Galveston, Houston, Port Arthur, Beaumont and Orange—plus several smaller ones.

An industrial trinity of iron, coal and limestone spurred the Midwest and other industrial centers. On the Texas coast, a chemical trinity of acids, hydrocarbons and fresh water booms developments in metalworking and other industries. It's estimated that 85 per cent of the nation's petrochem-

ical plants (worth over $2.5 billion) are concentrated there. In them some 90 producers make 200 different chemical products.

Feel the Pulse—To get an idea of the region's economic health, go to Houston. See where a five-and-dime store paid $2000 a front inch for property. See streets, schools, factories, office buildings and homes being built almost anyplace you look. The population in Houston and environs is growing at the rate of 50,000 a year. The city itself counted only 44,000 within its boundaries in 1900, 292,000 in 1930, 385,000 in 1940, 596,000 in 1950. Now it has nearly 700,000, and more than 1 million in the metropolitan area to make it the largest city in the South and Southwest. It has a labor force of 385,000.

Houston is the nation's second deepest seaport. Tonnagewise it handled a record 45.5 million tons in 1952 and 44.1 million tons in 1953. Only New York can top this.

Oil, Oil, Oil—Houston's phenomenal growth, similar to that up and down the Texas Gulf Coast, started in 1901 when oil first gushed from Spindletop some 90 miles away. Today, within a radius of 100 miles are 268 fields producing 200 million barrels of oil per year. Ringing the city are 14 refineries, and within it are more oil companies and industries allied with petroleum than in any other city in the world.

Houston is the most air conditioned city on earth. But it will be even more so in five years. In that period experts predict 30,000 three-to-five ton units a year will be sold there. Some 8000 air-conditioned autos were sold in southeast Texas in 1953—only 100,000 were sold in the nation! All that indicates the heat on the coast. There's shirt-sleeve weather for ten months a year, but summers are tough. Yet many a Texan hotly denies that, saying air conditioning makes the climate "right tolerable."

People and Markets—The popping population on the coast means more markets for consumer goods. Companies like Sheffield Steel Corp. (an Armco Steel Corp. subsidiary) expect more and more of their output to go that way, and light-metal producers—Aluminum Co. of America at Point Comfort; Reynolds Metals Co. near Corpus Christi; and Dow Chemical Co. in Freeport—all anticipate an upswing in the coast's demand for their aluminum and magnesium products.

The Houston chamber's survey reveals that 14 respondents believe that more aluminum fabricating plants are needed. They want rolling and extrusion mills and rolled products. Some 73 plants replied that more steel producing capacity is needed. Reports from nine plants stated that facilities were needed to supply brass, bronze and copper materials. Other respondents said that capacity was also needed for abrasives, alloy mechanical tubing, bearings, carbon mechanical tubing, cast iron, computing equipment, die castings, drill pipe, electrodes, high pressure cylinders, plating supplies, foundry supplies, nuts and bolts, refractories, roller chains and wire.

Consumer Shortages — There's also a need for capacity to produce consumer goods. Economists figure a potential market exists for 100,000 tricycles a year, 100,000 coaster wagons, 68,000 garden shovels. That, and the scarcity of some capacity for components, is a temporary liability, and for the time it means higher prices for many of those goods because of the freight costs.

At least partly counterbalancing that are low fuel costs, less expensive construction because of the climate, cheap power.

Business Trend—The Texas Gulf Coast, like the rest of the nation, has had a slump this year. But it started later and ended sooner than in most other sections. In Harris county (Houston), total nonfarm employment in July hit 360,535, compared to 355,750 a year earlier.

No wonder men like Brig. Gen. Robert E. Wood, retired chairman of Sears, Roebuck & Co., see the Texas Gulf Coast as one of the "two incredibly rich areas awaiting full development" (the Pacific Coast is the other). Texas and California will eventually become our two most populous states, he believes, adding: "I foresee the gulf crescent doubling its population by 1970."

Houston's growth stems partly from this ship channel

America's only tin plant operates at Texas City

Seconds Count..

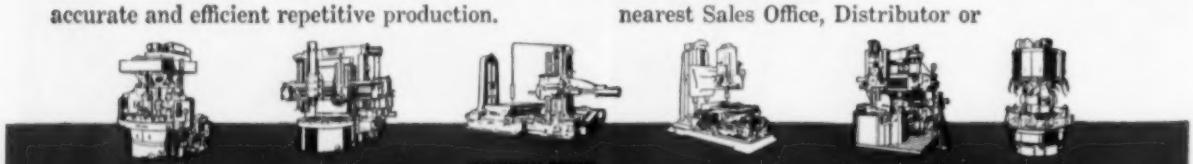
Time *is an Important Element in Profitable Manufacturing*

BULLARD MULT-AU-MATIC

Type "D" — 8"-12"-16" with 6 or 8 spindles
Type "D" — 16-23" and Type "K" — 6 spindles and 6 twin spindles — 8 spindles and 8 twin spindles

Hour after hour, the Bullard Mult-Au-Matic Method is proving its production capabilities in plants the world over in many and diversified industries. Years of constant development and improvement have proved the Mult-Au-Matic Method as a key unit for accurate and efficient repetitive production.

Seventy-three years of machine tool "know how" and craftsmanship have been skillfully combined in the Bullard Mult-Au-Matic—a machine that reduces manufacturing time and makes seconds count for profits. We invite your inquiries—write to your nearest Sales Office, Distributor or



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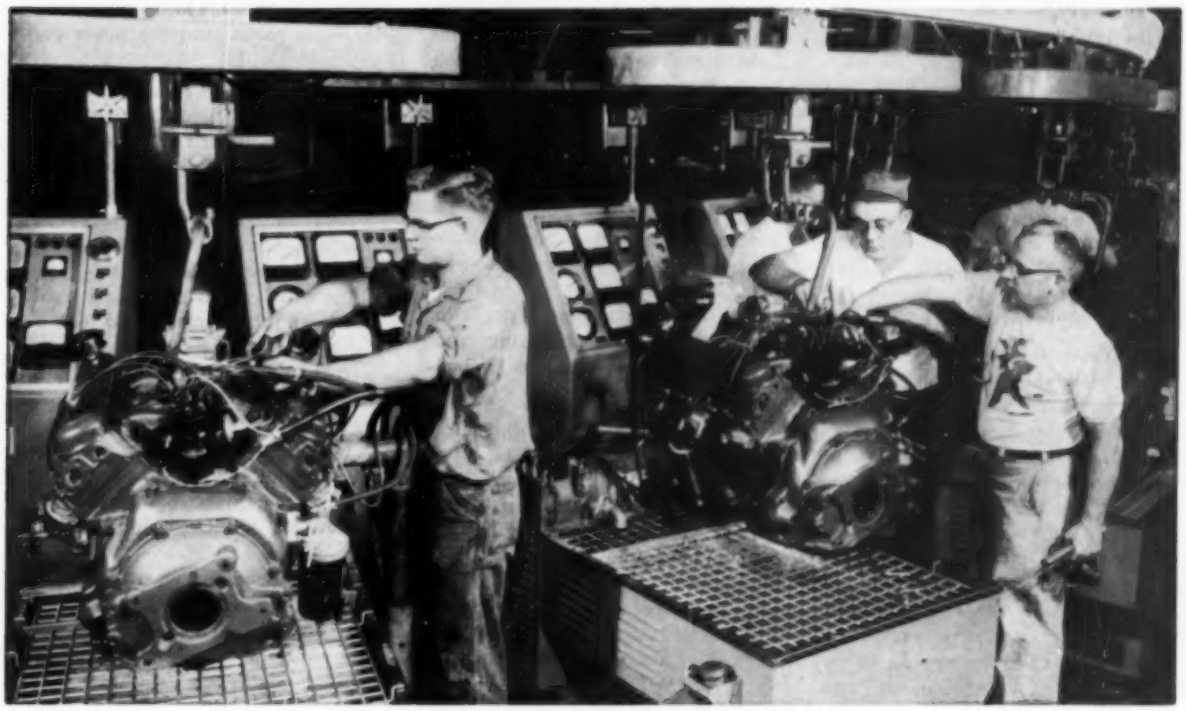

Even the testing of the Strato-Streak V-8 is automatic as . . .

Automation Turns the Trick on Pontiac Engine Line

DETROIT

A CONVEYOR SALESMAN'S dream—that's Pontiac's new V-8 engine plant.

Even today final touches of automation are waiting the end of the seven-day weekly production schedule to take their place in the 150-unit-per-hour line. Billed as "the most modern in the industry," a spot also claimed by competitors, the facility may be ranked near the top even by nonpublicity standards. It utilizes the best of reliability-proved machining and handling ideas, as well as some Pontiac pow-wowed originals.

Automaticity — From the time the blocks leave their pallets and enter the first station where the locating pads are milled for successive operations, V-8 blocks are processed automatically, even to being picked up at the end of the machining line by an overhead conveyor. No broaching is done on the block. Flat surfaces are milled and major holes are bored, furthering a trend away from broaching in recent auto engine lines.

Broaching is done, however, on the cylinder head connecting faces and manifold surfaces by a double-acting Cincinnati machine, with a finish broach later on a La Pointe. Through drilling, insertion of valve guides and profile milling of combustion chambers, the head is advanced automatically to completion. An interesting inspection on this part, incidentally, involves the check of valve seat concentricity relative to the valve guide holes. The maximum allowable tolerance read from air gages is 0.002 in.

Mechanics—Cross Tool-O-Meter boards are used throughout the head and block machining lines to determine tool change requirements based on the number of cutting cycles performed. Another interesting feature is the rollover station before some block machining operations. The block is rotated (to remove chips) and positioned for the next operation automatically.

Blocks are washed before the bearing caps are added, and the part starts through line boring of main bearing ways and camshafts. Throughout the operation one is impressed with the attention to quality. Automation appears simply and serviceably designed. Ingenuity is there, but maintenance men are not placed in jeopardy for the sake of cleverness.

Case in Point—A good example arises from the capacity need to split the flow of one line to two micromatic hones for finish honing of the main bearings, returning to one line when the operation is complete. A radial arm receives the block from the single line, turns it from horizontal to vertical via a pivoting fixture on the end and swings the block to the machine that is open. A second arm of similar design on the

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other side of the machines returns blocks to the interrupted single line once again.

Use of power and free conveyors is notable, not only in handling the engines themselves but also in supplying components to final assembly lines. Valve covers, oil pans and manifolds are supplied in this fashion to the point of assembly, there to wait, if necessary, until needed. Perhaps the ultimate in power and free utilization, however, is supplied in the finished engine storage room.

At Your Command — On two levels several hundred feet long are a series of parallel conveyors, each for storage of engines with a given set of accessories—pulleys for power steering, air conditioning, etc. At the request of the assembly department scheduling an engine for a given car starting down the line, a push of the proper button releases the engine needed on its power and free way. The system also releases engines to the shipping dock in accordance with shipping schedules to other GM plants.

Another power and free touch occurs during engine buildup. Traveling on a waist-high conveyor, the engine transfers to an overhead power and free system when the reciprocating parts are installed. It then is diverted to one of several Gisholt balancing machines where the correct amount to get the engine in balance is removed automatically by drilling from the crankshaft. Released by the operator, the engine returns to a second waist-high line to complete its trip through assembly.

Ingenuity—An interesting gadget in final engine assembly is an automatic nut runner for the eight bearing cap studs. The moving block trips a switch which drops the runner from its overhead track. Locating from the end of the block, the runner moves with the block as it tightens all eight studs simultaneously to a predetermined torque.

The flavor of the whole installation is keynoted by piston machining. Received from five diecasting suppliers, the pistons, now unloaded manually, soon will be unloaded automatically, completing a setup that is almost automatic from carton to cylinder.

How It's Done—From the carton the pistons go to an eight-station Hoern & Dilts machine. Locating from the inside of the head, the piston is clamped horizontally in a fixture while weight pads are milled, wrist pin hole is rough bored, locating holes are drilled in the weight pads and reamed, the top is spot-faced and centered, the wrist pin retaining ring groove is cut and the wrist pin hole is chamfered. All this takes place on one machine, which has a 16-station indexing table and can turn out 900 finished parts an hour.

The parts are then automatically lifted to a conveyor supplying a battery of modified Acme-Gridley automatics, the upper conveyor carrying parts to enter the machines with a lower conveyor carrying the completed parts away. As the automatics index, a piston drops into an adapting fixture on each of the eight spindles. It clamps the skirt on center, with a center clamping against the spot face on the other or head end of the piston. The eight-spindle machine then carries the part around to stations which groove the skirt, rough turn it, finish the ring lands, turn to length on the ends, rough and chamfer the ring grooves and finish them. Following these operations, the parts drop off the machine like screw machine parts onto the lower conveyor.

Inspection — This carries the parts to a Sheffield air gage which checks dimensions of the Gridley operation, including a tolerance on ring grooves of plus or minus 0.0005 in. From the inspection machine, they travel up to another upper conveyor, down to a machine which drills 12 oil and smoke holes simultaneously and out on a lower conveyor. Once again, the parts pass through an air gage which checks to see all 12 holes have been drilled.

Up again, still automatically, the pistons are snared by grinders needing parts and channeled down where an elliptic grind is given the piston skirt. Ejected out on a lower conveyor when the grinding cycle is completed, the parts are air gaged again to be sure the taper of plus nothing, minus 0.001 in., is held.

Procedure — A conveyor then takes the pistons to a machine that weighs each one and mills enough off each weight pad automatically to get the weight within plus or minus 1.7 grams. The pistons are then conveyed automatically to the tin plating setup through which they proceed and emerge automatically at an Ex-Cell-O precision borer. Three bars bore the wrist pin holes of three pistons simultaneously, the rough and finish bore being done by successive cutters on each bar. The pistons are then air gaged in the wrist pin bore, and the bore is bearingized, giving a burnished appearance.

The last operation in the piston department involves the loading of pistons onto a conveyor which snakes its way back and forth through a cold chamber to bring the pistons to a temperature of 70° F prior to sizing. This takes about 15 minutes, and the pistons emerge on the conveyor at the sizing machine where they are sorted automatically by 0.00025-in. OD steps into ten chutes, one for each size. In addition, the machine also stamps the wrist pin hole diameter in one of four 0.0001-in. steps, as well as the piston OD to avoid possible mixups.

Auto, Truck Output

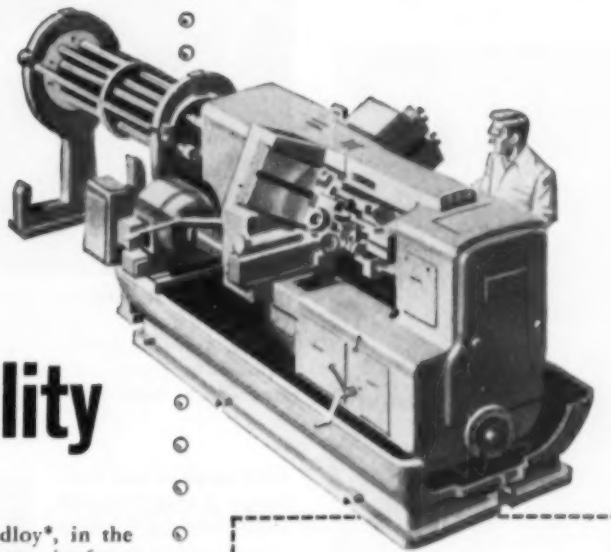
U. S. and Canada

	1954	1953
January	594,789	614,000
February	573,801	628,017
March	672,485	752,149
April	676,233	782,491
May	621,249	684,843
June	623,732	713,778
July	543,534	756,592
August	523,799	640,186
September	364,441	605,228
October	311,968†	651,153
November		457,852
December		529,588
Total		7,815,877

Week Ended	1954	1953
Oct. 23	62,376	149,794
Oct. 30	90,662	145,311
Nov. 6	116,179	133,783
Nov. 13	141,154	115,748
Nov. 20	159,931†	108,729
Nov. 27	125,000*	74,290

Source: Ward's Automotive Reports. †Preliminary. *Estimated by Steel.

Aristoloy steels with lead added for improved machinability



● There's "seasoning" added to Ledloy*, in the form of lead that gives you ⅓ more capacity from your screw machines. This free machining steel has a built-in bonus because Ledloy steel feeds faster, finishes better, and greatly reduces tool wear. This is how it's accomplished: Evenly distributed, submicroscopic particles of lead serve to reduce friction between tool and chip. Forgability, carburization and heat treatment are not affected, and no health hazards are involved in normal machining, handling, heat treating, or forging.

Our Field Metallurgist will be happy to discuss Ledloy with you and how it can be applied to your product. Similar advantages can also be obtained through use of leaded alloy steels which are available in full range of A.I.S.I. or S.A.E. standard analyses. Call or write today for complete information.

*Inland Ledloy License

ARISTOLOY STEELS

COPPERWELD STEEL COMPANY
(STEEL DIVISION) WARREN, OHIO

For export—Copperweld Steel International Company, 117 Liberty St., New York

DISTRICT OFFICES

P. O. Box 1633 Tulsa, Oklahoma	1578 Union Commerce Bldg. Cleveland, Ohio
315 Hollenbeck Street Rochester, New York	176 W. Adams Street Chicago, Illinois
117 Liberty Street New York, New York	1807 Elmwood Avenue Buffalo, New York
711 Prudential Building Houston 25, Texas	7251 General Motors Bldg. Detroit, Michigan
80 King Street West Toronto, Ontario, Canada	143 Washington Avenue Albany, New York
Monadnock Building San Francisco 5, Calif.	611 Beury Building Philadelphia 40, Penna.
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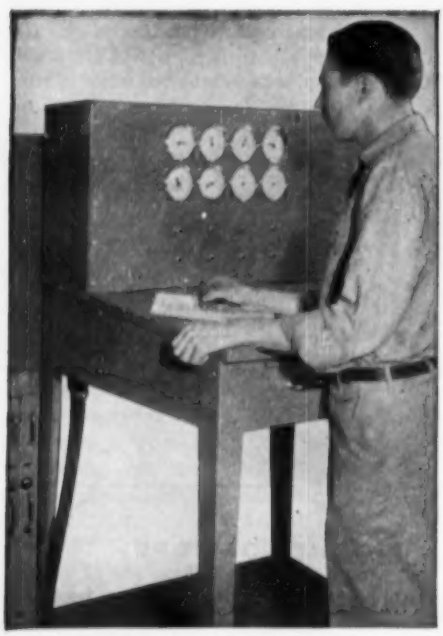
Why TIMKEN® forging steels give you uniform, high quality forgings

THIS MICROSCOPIC CHECK of your order makes sure that Timken® forging steels have uniform grain size after heat treatment. Result: higher ductility, higher impact. This is another example of the many ways the Timken Company controls quality at every step in production.

INDIVIDUAL HANDLING of your order enables us to target conditioning procedure to your forging requirements. Your forging rejects are minimized. And you save steel because the good dimensional tolerances of Timken bars produce uniform weight multiples with a minimum of steel lost in flashings.

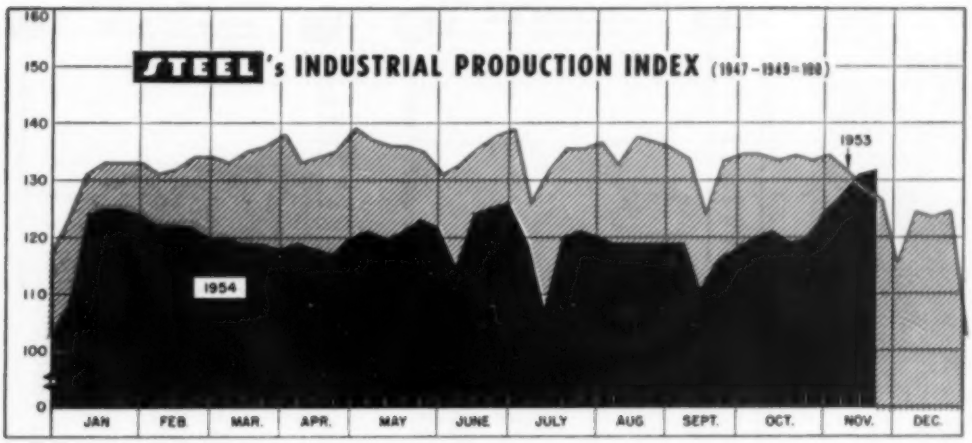


RIGIDLY CONTROLLED CHEMISTRY assures you of uniform composition in every forging bar. This spectrometer, for example, tells the exact composition of a melt in just 40 seconds. Results are flashed back to the furnace so the melter can maintain constant control of the heat analysis.

YOU HAVE FEWER FURNACE ADJUSTMENTS when you use Timken forging steels. Every lot responds uniformly to heat treatment because every lot has the same physical and chemical properties. Always specify Timken forging steels. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD — THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended Nov. 20.

Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 11%.

Industrial Output Passes Year-Ago Levels

HIGHEST POINT in over a year —that's where STEEL's industrial production index is now. And odds are that it will go even higher than its present 132 before the year is over.

At any rate, it's pretty sure to stay ahead of the 1953 line for the rest of 1954. Much of the cause of the rising index is traceable directly to the auto industry and its beneficial effect on steel buying.

Overtime—Weekly auto production was at its highest point in 65 weeks, with many plants working overtime to provide dealers a ready supply of new models. Most plants scheduled work last Friday (the day after Thanksgiving). At this stage of the sales race every working day means money in the bank.

That means steel will continue to be used at a rapid rate. Ingot production is at its highest point this year, close to 80 per cent of capacity, and chances are it will continue to show small week-to-week increases.

Insurance—Partly responsible is a slight increase of orders in answer to lengthening delivery dates, a kind of insurance against further extension of lead time. No scare buying splurge is likely, users just want to fatten inventories a little.

Electrical output continues high, responding to a dual boost from increasing factory overtime and short autumn days. In the important central industrial district, consumption is steadily advancing over year-ago levels, according to Edison Electric Institute statistics. Southeast and South Central regions show substantial increases over last year's consumption.

Soft Spot—Freight car loadings are the weakest link in the index chain, but they show signs of firming at around 700,000 a week. They are closing in on 1953 levels, but at this time a year ago

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,890	1,892	1,956
Electric Power Distributed (million kwhr)	9,088[1]	9,197	8,416
Bitum. Coal Output (daily av.—1000 tons)	1,454	1,404	1,472
Petroleum Production (daily av.—1000 bbl)	6,185[1]	6,220	6,259
Construction Volume (ENR—millions)	$301.8	$371.5	$271.7
Automobile, Truck Output (Ward's—units)	159,931	141,154	108,729
TRADE			
Freight Car Loadings (unit—1000 cars)	690[1]	709	726
Business Failures (Dun & Bradstreet, no.)	215[1]	227	223
Currency in Circulation (millions)[3]	$30,233	$30,278	$30,487
Dept. Store Sales (changes from year ago)[3]	−2%	+5%	+2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$18,182	$19,291	$20,745
Federal Gross Debt (billions)	$278.7	$278.7	$275.0
Bond Volume, NYSE (millions)	$22.8	$25.0	$16.8
Stocks Sales, NYSE (thousands of shares)	16,791	16,157	6,720
Loans and Investments (billions)[4]	$84.4	$84.9	$80.5
U. S. Gov't. Obligations Held (billions)[4]	$37.4	$37.4	$32.4
PRICES			
STEEL's Finished Steel Price Index[5]	194.53	194.53	189.38
STEEL's Nonferrous Metal Price Index[6]	218.3	217.2	204.8
All Commodities[7]	109.7	109.7	109.8
Commodities Other Than Farm & Foods[7]	114.5	114.5	114.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1954, 2,384,549. 1953, 2,254,459. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

A NAGGING WIFE MAY SAVE YOUR LIFE

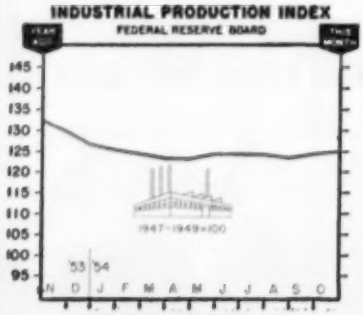
IF YOU ARE OVER 45 and your wife keeps insisting that you should have *two* chest x-rays every year... don't blame her. *Thank* her! Semi-annual chest x-rays are the best "insurance" you can have against death from lung cancer.

The cold fact is that lung cancer has increased so alarmingly that today you are six times more likely to develop lung cancer than a man of your age 20 years ago. Our doctors know that their chances of saving your life could be as much as ten times greater if they could only detect lung cancer before it "talks"... before you notice any symptom in yourself. That's why we urge you to make semi-annual chest x-rays a habit—for *life*.

To see our new life-saving film "The Warning Shadow" call the American Cancer Society office nearest you or simply write to "Cancer" in care of your local Post Office.

American Cancer Society

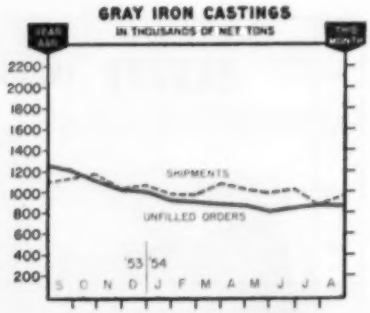
THE BUSINESS TREND



(seasonally adjusted)

	Total Production		Primary Metals		Metal Fabricating	
	1954	1953	1954	1953	1954	1953
Jan.	125	134	111	135	155	168
Feb.	124	134	108	137	152	168
Mar.	123	135	103	136	148	168
Apr.	123	136	104	136	146	169
May	124	137	106	139	147	169
June	124	136	108	137	145	168
July	124	137	104	136	148	171
Aug.	123	136	105	137	148	171
Sept.	124	133	117	130	148	166
Oct.*	125	132	111	128	148	165
Nov.	...	129	...	122	...	159
Dec.	...	126	...	113	...	156
Avg.	...	134	...	132	...	167

Federal Reserve Board. *Preliminary.



	Thousands of Net Tons			
	Shipments		Unfilled Orders*	
	1954	1953	1954	1953
Jan.	932	1,162	872	1,333
Feb.	936	1,136	865	1,332
Mar.	1,047	1,264	842	1,376
Apr.	995	1,277	826	1,306
May	943	1,186	775	1,272
June	987	1,196	804	1,246
July	821	1,056	829	1,233
Aug.	935	1,069	830	1,223
Sept.	...	1,106	...	1,170
Oct.	...	1,142	...	1,076
Nov.	...	1,004	...	977
Dec.	...	1,032	...	955
Total	...	13,630		

*For sale. U. S. Bureau of the Census.

Charts Copyright 1954 STEEL.

loadings had slipped considerably from third-quarter highs.

The lower rail activity shows up in the number of locomotives on order. The 158 engines on order as of Nov. 1 are only one-fourth of the backlog a year ago, according to the Association of American Railroads.

Ups and Down—For the statisticians: Steel production is 117 per cent of the 1947-1949 average; auto output is 149 per cent of that 3-year average; electrical output, 172 per cent; and freight car loadings for revenue, 90 per cent.

One reason why the fact that STEEL's index passed the year-ago level should leave no room for complacency; In fourth quarter of 1953, industrial production was falling. Steel production had slipped; the auto industry was changing over. The index will have to get above 135 before it can be said that recovery is almost complete and that a new era of industrial activity has begun.

Federal Building Rises . . .

Construction continues as a bulwark of the economy. Contract awards of $302 million in the week ended Nov. 18 brought the total in the first 46 weeks of 1954 to $12.8 billion, only 4 per cent behind last year's record high.

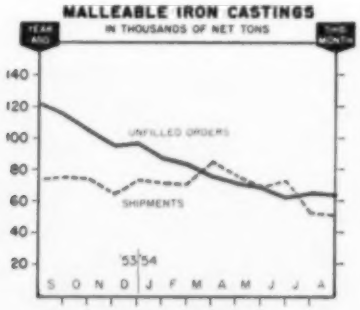
A gain in federal awards sustained the high level of awards, offsetting drops in state and local contracts, reports *Engineering News-Record*. Housing and commercial awards had their best weeks since September. Sharply lower industrial building dropped totals in that category 36 per cent behind 1953's.

Middle of the Road . . .

But in spite of predictions for even higher construction next year, general industrial production will show only a slight gain in 1955. That's a pretty common diagnosis now: Business in '55 will be somewhere between 1953 and 1954.

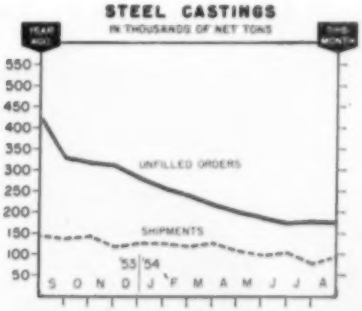
Carrying the upswing along, says A. W. Zelomek, economist for the International Statistical Bureau Inc., will be: More normal inventories in relation to sales, continued favorable consumer buying, sustained construction, increased production for defense and high level of public works.

Putting an edge on consumer appetites for both durable and nondurable goods will be a huge



Thousands of Net Tons	Shipments		Unfilled Orders*	
	1954	1953	1954	1953
Jan.	70.3	87.2	85.6	174.8
Feb.	69.1	86.5	81.6	175.1
Mar.	84.3	94.5	74.2	177.8
Apr.	74.5	95.9	69.1	174.5
May	67.9	82.1	67.0	160.4
June	72.8	86.5	60.2	151.0
July	50.9	77.1	53.7	137.3
Aug.	59.2	73.9	62.4	120.8
Sept.	....	74.3	....	114.5
Oct.	....	73.5	....	104.0
Nov.	....	63.4	....	93.2
Dec.	....	72.1	....	95.6
Total	....	966.9		

*For sale, U. S. Bureau of the Census.



Thousands of Net Tons	Shipments		Unfilled Orders*	
	1954	1953	1954	1953
Jan.	122.8	167.2	251.8	706.5
Feb.	116.5	175.7	234.6	644.3
Mar.	122.3	182.3	214.3	634.6
Apr.	105.8	179.6	197.9	573.6
May	94.6	165.6	182.5	525.0
June	100.0	164.7	189.6	475.8
July	75.8	139.6	170.6	467.9
Aug.	89.6	141.3	165.3	418.9
Sept.	....	135.3	....	327.2
Oct.	....	140.7	....	313.7
Nov.	....	114.1	....	308.5
Dec.	....	123.3	....	278.4
Total	....	1,829.3		

*For sale, U. S. Bureau of the Census.

array of new items and better promotion, advertising and selling, Mr. Zelomek writes in the "Bulletin of the National Association of Purchasing Agents." Helping push production upward will be steady activity in the aviation industry, further expansion in electronics and continuing good business in appliances.

It's likely that employment gains will lag behind the rising industrial output. Greater efficiency is one of the reasons.

Full Speed Ahead . . .

One company, at least, doesn't go along with the conservative view for 1955. Seaporcel Metals Inc., Long Island City, N. Y., says it's going to "burst at the seams" on the basis of a record October volume of orders.

The company is a supplier of architectural porcelain enamel much in vogue in building construction. Orders for the firm's porcelain-on-steel and porcelain-on-aluminum panels have come from Hawaii, Alaska, Latin America and all over the U. S.

The orders point to continuing heavy building of schools and bode well for offices, stores, banks, hospitals and churches.

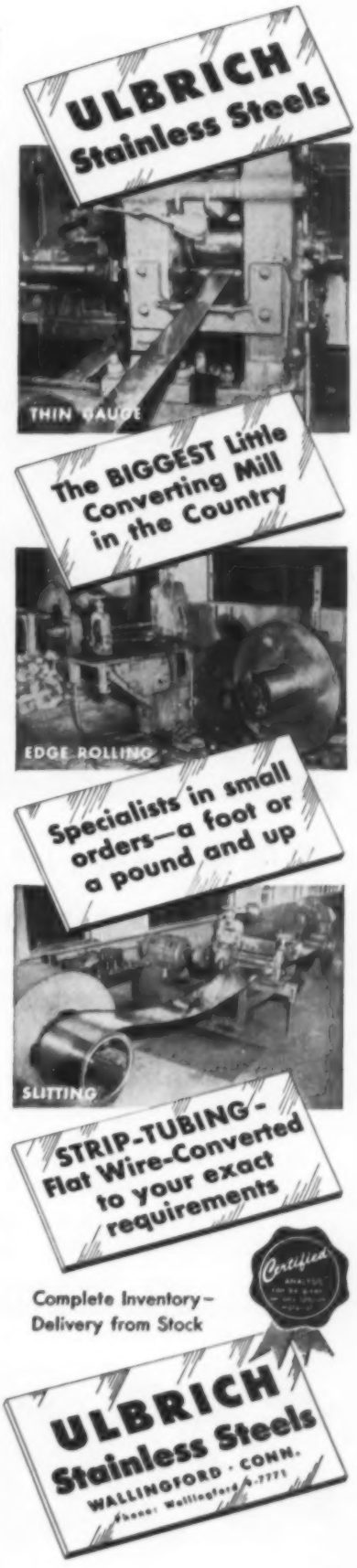
Pittsburgh Business Gains . . .

Business in the Pittsburgh district is getting steadily better, according to the Bureau of Business Research of the University of Pittsburgh. The bureau's index of business activity has been rising irregularly since July.

Much of the rise, of course, is due to the pickup in the iron and steel industry. But the bureau reports that increased freight shipments and trade are helping.

Trends Fore and Aft . . .

General Motors last week produced its 50-millionth car in the United States . . . At the end of September, Chevrolet was 98 new car registrations ahead of Ford. Chevvie's earlier introduction date may gain it a little more breathing space in the home stretch for the best seller title . . . Factory sales of 263,197 standard size household vacuum cleaners in October were highest since March, second highest since March, 1953, according to Vacuum Cleaner Manufacturers' Association . . . Over 1 million TV sets were shipped to dealers in September, reports Radio-Electronics-Television Manufacturers Association.



FASTEST THING IN FASTENINGS®

TINNERMAN

Speed Nut

SAVINGS STORIES

"EASY does it" with SPEED NUTS®

...cuts assembly time 87%!

Easy Spindrier

What was causing delays in the production of the new Easy Spindrier? Easy engineers recently found out in a hurry. It was the motor mount bracket assembly. A staking operation was creating a decided bottleneck.

Borrowing on their own long-time experience with SPEED NUT brand fasteners—and the help of the Tinnerman field engineer—they hit on a highly successful solution using a special Flat-Type SPEED NUT!

Proof of the success was supplied through a startling 87% saving in production time—and an overall cost savings of 47%!

Little wonder, then, that Easy engineers saw to it that over 60 SPEED NUTS were designed into the new Easy Automatic Washers.

Special self-retaining Flat-Type SPEED NUT snaps easily into existing notch in bracket. Replaces round nut which was staked down, often causing distortion of nut—this meant re-tapping. Also, paint clogged around nut, causing screws to bind. Paint can't clog SPEED NUTS.

Send today for your copy of SPEED NUT "Savings Stories"; write: TINNERMAN PRODUCTS, INC., Department 12, Box 6688, Cleveland 1, Ohio. *In Canada:* Dominion Fasteners Limited, Hamilton, Ontario. *In Great Britain:* Simmonds Aerocessories, Ltd., Treforest, Wales. *In France:* Aerocessoires Simmonds, S. A., 7 rue Henri Barbusse, Levallois (Seine).

SAMUEL S. AUCHINCLOSS
. . . president of Cleveland Welding

W. T. ADAMS
. . . Republic Steel purchasing mgr.

ROBERT HOWARD
. . . Victor Adding Machine div. mgr.

Samuel S. Auchincloss, president of DeWalt Inc., Lancaster, Pa., was named president of **Cleveland Welding Co.,** Cleveland, to succeed **William A. Sipprell,** resigned. Both concerns are subsidiaries of American Machine & Foundry Co. Mr. Auchincloss continues as DeWalt president, a position he has held since January, 1953. He has been associated with AMF for 18 years.

J. C. Poyner was appointed purchasing agent of the **Dodge Division** of Chrysler Corp., Detroit. In addition, he continues to supervise the procurement of steel and other raw materials for the corporation, a function he has performed for the last seven years as divisional purchasing agent of Chrysler.

Eugene C. Bauer, president, was elected chief executive officer of **Poor & Co.,** Chicago. He succeeds **V. C. Armstrong,** who remains as chairman of the board.

Charles T. Zaoral, vice president-operations, **New York Air Brake Co.,** New York, was elected president. He succeeds **Bernard Peyton,** who becomes chairman of the board.

Norman Palmer was made production manager of **American Radiator & Standard Sanitary Corp.'s** stamping plant, Buffalo.

W. T. Adams was appointed manager of purchases and raw materials of **Republic Steel Corp.,** Cleveland. **J. H. Graebing** and **L. H. Ransom** were made assistant managers of purchases. Mr. Adams succeeds **Frank J. Laskey,** retired.

Lyman K. Shepard was made sales manager, **Wisconsin Drill Head Co.,** Milwaukee. He was, until recently, sales manager, drill unit division, Rockwell Mfg. Co.

Raymond A. Vogel was appointed executive in charge of procurement and schedules for **General Motors Corp.,** Detroit, succeeding **Daniel F. Hulgrave** who continues on the manufacturing staff in a consulting capacity. Mr. Vogel was manager of purchases for GM's Cadillac Division for the last six years.

Logansport Machine Co. Inc., Logansport, Ind., elected **E. L. Kimes** vice president and treasurer and **L. L. Austin** vice president-secretary.

Russell E. Meyers was made manager of manufacturing facilities and engineering for **General Electric Co.'s** capacitor department, Hudson Falls, N. Y.

Henry R. Friedberg joined **Frank L. Crobaugh Co.,** Cleveland, in the capacity of metal finishing consultant.

Robert Howard was made manager, Vic-Dar Division, **Victor Adding Machine Co.,** Chicago. He has had engineering and production administration experience both with RCA and as manager of the government division of Webster-Chicago Corp.

L. H. Schneider was promoted to chairman of the board and chief executive officer of **Toledo Stamping & Mfg. Co.,** Toledo, O. He is succeeded as president by **Edwin M. Tasker,** who formerly served as vice president in charge of sales and engineering.

Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., elected **Robert H. Burdsall** vice president and secretary and **William U. Cigliano** vice president. Mr. Burdsall is also manager of market development and advertising.

Henry A. Berliner retired as board chairman of **Engineering & Research Corp.,** Riverdale, Md., following acquisition of the firm by A. C. F. Industries Inc.

John A. Robertshaw was elected president, **Robertshaw-Fulton Controls (Canada) Ltd.,** Toronto, recently formed subsidiary of Robertshaw - Fulton Controls Co. **George A. Elliott** was elected vice president and general manager; **Walter H. Steffler,** secretary and

GEORGE PERRAULT JR.

ROBERT POTTER

. . . E. W. Bliss Co. appointments

treasurer; **B. D. Taylor**, comptroller; and **H. William Biggar**, assistant secretary and assistant treasurer.

G. V. Woody, manager, processing machinery department, general machinery division, **Allis-Chalmers Mfg. Co.**, Milwaukee, was appointed special assistant to the vice president, director of sales for the division. He is succeeded by **William M. Wallace.**

John V. Boardman, previously general superintendent, **Green River Steel Corp.**, Owensboro, Ky., was elected vice president in charge of operations.

George Perrault Jr., sales manager, rolling mill division at Salem, O., for **E. W. Bliss Co.**, assumes duties of division manager. **Robert Potter**, vice president and manager of the Salem division, was made assistant executive vice president. He will be in the company's general offices in Canton, O., and will assist in general supervision of the manufacturing divisions and subsidiaries.

Adm. Alan G. Kirk was elected president of **Mercast Corp.**, New York, an affiliate of Atlas Corp. He succeeds **S. J. Sindeband**, recently appointed president of Teleregister Co. Admiral Kirk served as ambassador to Russia during 1949-1952. He was elected chairman of Mercast last year.

M. S. Pancoast will represent the metal processing department of **Pennsylvania Salt Mfg. Co.** in its New York territory, with headquarters in Syracuse. He will succeed **Clinton S. Burhans**, retired.

R. D. Merrill was promoted to the new position of director of engineering for **Stone Container Corp.**, Chicago. He is replaced as head of methods and design engineering for the Chicago plant by **Edward C. Hauser**, until recently vice president-production for Krafco Container Corp.

Clarence A. Weltman was named executive vice president and technical director, **Alox Corp.**, Niagara Falls, N. Y. **Dr. Donald W. Andrus** assumes duties of vice president in charge of production.

Bridgeport Brass Co. appointed **N. Bross Decker** manager of its Boston district sales office.

John J. Monahan, who has served as New England district manager, **Bristol Brass Corp.**, Bristol, Conn., was promoted to assistant sales manager of the corporation.

Matthew J. Delehaunty was named manager of mechanical goods sales for the mechanical goods division of **United States Rubber Co.** He will have headquarters at the firm's Passaic, N. J., plant. He has

JOHN V. BOARDMAN

. . . Green River Steel v. p.-operations

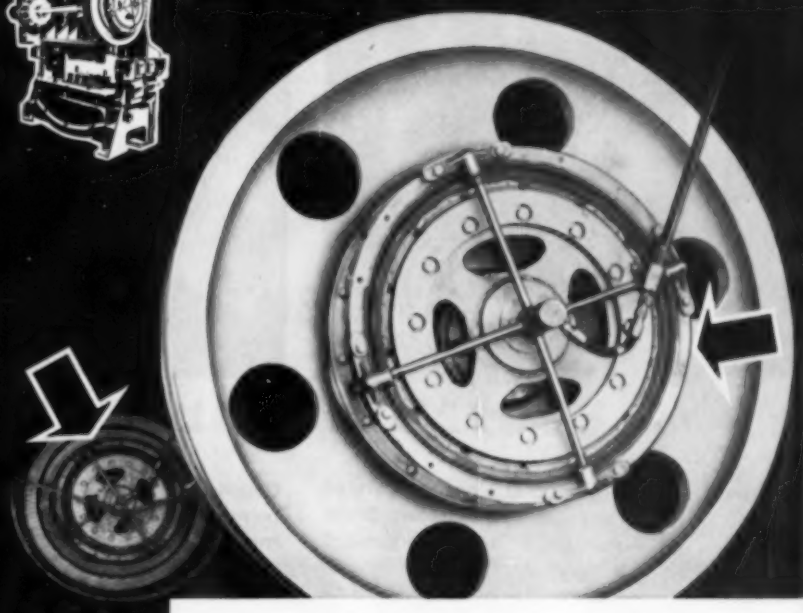
ADM. ALAN G. KIRK

. . . heads Mercast Corp.

MATTHEW J. DELEHAUNTY

. . . U. S. Rubber div. sales mgr.

TYPICAL EXAMPLE OF FAWICK AIRFLEX APPLICATIONS ON MODERN PRODUCTION MACHINES



EXECUTIVE REMINDER FOR INCREASED PRODUCTION

Final profit figures reflect all types of production economies effected in industry, and one of the most important of these economies results from increased production.

Time after time in all kinds of processing and manufacturing, FAWICK AIRFLEX INDUSTRIAL CLUTCHES AND BRAKES have provided increased production on machines that were already considered highly efficient.

Your industrial production equipment performing cyclic operations can be readily equipped for increased production with performance-proved FAWICK units. The outstanding FAWICK ENGINEERING SERVICE is available to you, without cost or obligation, to help you investigate the advantages of FAWICK AIRFLEX CLUTCHES AND BRAKES as applied to your specific production machines.

FAWICK AIRFLEX DIVISION
FAWICK CORPORATION
9919 Clinton Road • Cleveland 11, Ohio

FAWICK Airflex
INDUSTRIAL CLUTCHES AND BRAKES

OTHER FAWICK APPLICATIONS IN INDUSTRIAL PROCESSING

IRVING G. BOHRMAN
. . . heads Perfex Corp.

E. S. STEIGNER
. . . new post at Youngstown Sheet & Tube

STUART W. GEORGE
. . . Couch-Uthe Co. chief engineer

been manager of commodity sales since June.

Irving G. Bohrman was elected president, **Perfex Corp.**, Milwaukee. He fills the vacancy left by resignation of **Carroll E. Lewis. Ernest H. Panthofer** was elected vice president. He has been assistant general manager, radiator division. Mr. Bohrman, associated with Perfex since 1940, most recently held the position of vice president and general manager, radiator division.

Paul Garmus, graphitic steel field engineer for **Timken Roller Bearing Co.**, transferred to the Los Angeles office to handle the sales of Timken graphitic tool steels on the West Coast. He is succeeded in the Detroit office by **Raymond P. Brandenburg.**

E. S. Steigner was appointed supervisor of **Youngstown Sheet & Tube Co.'s** newly organized service engineering department, Youngstown. He has been a metallurgical engineer in the research and development department.

C. A. Chamberlain was elected secretary, **E. W. Bliss Co.**, Canton, O. He assumes his new duties in addition to those of assistant to the president, a position he has held since January.

At the Los Angeles plant of **Joseph T. Ryerson & Son Inc., C. D. D'Amico** was named manager of sales to succeed **C. H. Hallett,** who moves to the Ryerson plant in Chicago for special assignment. Replacing Mr. D'Amico as manager, stainless steel department, is **F. X. Kinzie.**

Couch-Uthe Co., Elyria, O., appointed **Stuart W. George** chief engineer. Mr. George was formerly chief tool engineer of National Acme Co.

Timken Roller Bearing Co., Canton, O., appointed **J. Frank Corbin** traffic manager. **Roy French** becomes assistant traffic manager.

Richard H. Tingey, assistant technical manager, shipbuilding division, **Bethlehem Steel Co.**, Quincy, Mass., was appointed manager. He succeeds the late **John E. Burkhardt.**

Francis L. Woods was made manager of engineering for **General Electric Co.'s** distribution transformer department, Pittsfield, Mass. He succeeds **Max I. Alimansky,** transferred to Lynn, Mass.

OBITUARIES . . .

R. S. Saddoris, 55, quality control director, **A. O. Smith Corp.**, Milwaukee, died Nov. 13.

Floyd E. Allen, founder and owner, **F. E. Allen Co.**, Buffalo, manufacturers' representative of steel and brass products, died Nov. 5.

Walter E. Hagenbuck, 55, a partner in **Ford & Hagenbuck,** Milwaukee, machine tool manufacturers' agent, died Nov. 5.

Thomas Winterton, 43, manager of advertising and sales promotion, **Latrobe Steel Co.**, Latrobe, Pa., died Nov. 15.

Charles T. Allen, 68, president, **Allen Tool Corp.**, Syracuse, N. Y., died Nov. 11.

Leslie A. Touzalin, 73, who retired in 1946 as manager-raw materials, fuel and power of the Chicago district of **United States Steel Corp.**, died Nov. 13.

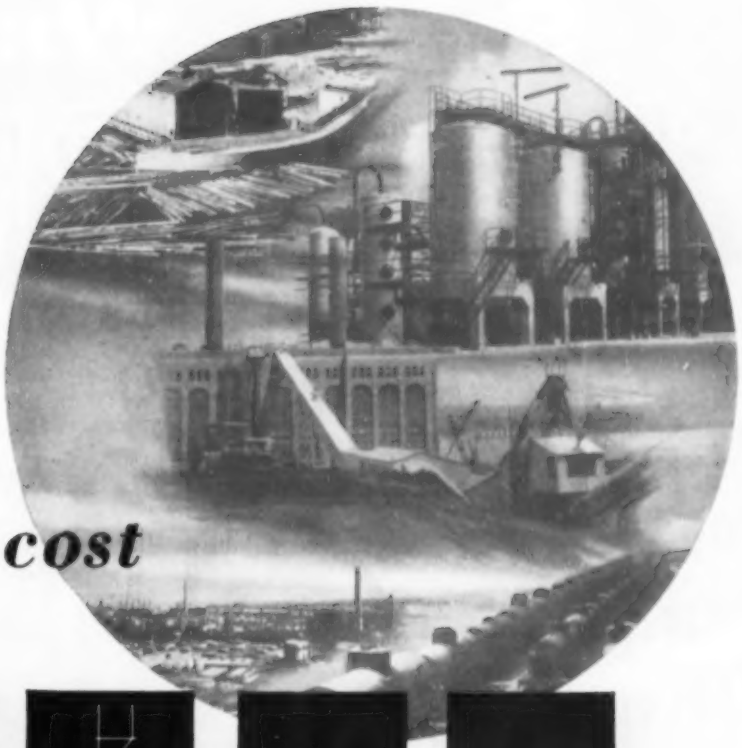
Eldon H. Sager, Pacific Coast divisional sales manager for **Cory Corp.**, died of a heart attack at his Pasadena, Calif., home, Oct. 30.

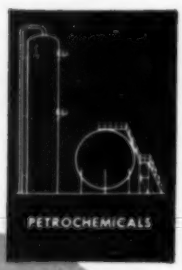
James F. Jones, 65, vice president and general manager, **United States Powder Corp.**, died Nov. 8 in Palo Alto, Calif., after a short illness.

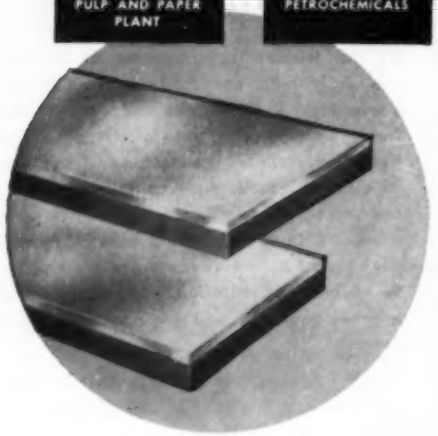
Fred H. Johnson, 58, president, **Progressive Welder Sales Co.** and **Progressive Welder Co.**, Detroit, died Nov. 2.

Benjamin P. Graves, 69, director of design for Brown & Sharpe Mfg. Co., Providence, R. I., died Nov. 11.

how to get Stainless Steel advantages ...*at lower cost*







If your fabrication problem involves corrosion resistance or protection against product contamination, it will pay you to investigate the economies made possible by Claymont Stainless-Clad Plates.

For numerous types of tanks, vessels and processing equipment, Claymont Stainless-Clad Plates give all the advantages of solid stainless steel—yet with substantial savings.

Produced in our plant to exacting standards, these plates are manufactured with painstaking care under personalized supervision. Our facilities provide definite assurance of prompt delivery. For detailed information write direct to Claymont Steel Products Department, The Colorado Fuel and Iron Corporation, 813 West Street, Wilmington 99, Delaware.

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PRATT & WHITNEY

KELLERFLEX

SERIES "M" FLEXIBLE SHAFT MACHINES

BY FAR THE FINEST . . .
FOR FAST,
LOW-COST
FINISHING

RUGGED . . . for constant, heavy-duty use.

VERSATILE . . . 16 speeds (increased to 32 by high speed attachment) and a wide choice of attachments to handle an almost unlimited variety of jobs.

PRECISION BUILT . . . to insure smoother, more accurate performance and longer life, with substantially reduced maintenance costs.

POWERFUL . . . ¼ to 1 hp . . . all you need for any job.

FAST . . . speeds to 24,000 rpm . . . *only* machines with *proved* performance at speeds over 10,000 rpm, essential for fully efficient use of fast-cutting carbide burs.

ALL-PURPOSE MOUNT . . . using the tray, the Series "M" Machine becomes a bench model; using the eye-bolt, it becomes a suspension type.

The leading manufacturer of flexible shaft machines for over twenty-five years, Pratt & Whitney is the oldest in the field. This long experience is reflected in the Kellerflex. Not only the machine . . . but also its attachments, handpieces and cables . . . are universally recognized as the finest ever produced. In hundreds of plants throughout the country Kellerflex Machines are helping to speed up production, reduce costs and improve quality . . . and they can do the same for you.

EASY SPEED CHANGES

. . . by depressing the spring-suspended jackshaft and shifting belts . . . and by re-arranging the jackshaft sheaves . . . no tools required.

SEND NOW FOR FULL INFORMATION

Write on your Company letterhead for complete information. Data on all attachments and accessories is included.

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DIVISION NILES-BEMENT-POND COMPANY
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First Choice for Accuracy

BRANCH OFFICES . . . BIRMINGHAM • BOSTON • CHICAGO • CINCINNATI • CLEVELAND • DALLAS (The Stacey Co.) • DETROIT • HOUSTON (The Stacey Co.)
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MACHINE TOOLS • CUTTING TOOLS • GAGES

Brass Firms To Unite

Bristol Brass plans to move Accurate Brass operations to Connecticut by mid-1955

OPERATIONS of Accurate Brass Corp., Glendale, N. Y., will be integrated with those of Bristol Brass Corp., Bristol, Conn. Formal acquisition of Accurate Brass by Bristol took place Nov. 1 (STEEL, Oct. 18, page 78).

A complete survey is being made of Bristol Brass facilities to determine the best means of uniting the activities. Results of the study will determine whether the Accurate operation can be brought into the present Bristol Brass plant or whether new facilities must be constructed.

Accurate is a large independent producer of brass and aluminum forgings. Its manufacturing facilities are expected to be moved to Bristol by mid-1955.

Executives—President of the new firm, a wholly owned subsidiary of Bristol Brass, is Roger E. Gay, also president of the parent firm. Philip. A. Coleman, assistant general sales manager of Bristol Brass, is vice president; George R. Young, Bristol comptroller, is treasurer; Frederick W. Beach, secretary of Bristol Brass, is secretary; and John B. Breckenridge, assistant to the president of Bristol Brass, is assistant secretary and assistant treasurer.

In addition to the officers, the following are members of the board of directors of the new company: Donald Gay, general sales manager of Bristol Brass; Edwin P. McIntire, Bristol Brass vice president in charge of New York sales; Otto E. von Au, former president of Accurate Brass now serving as consultant to the new company; and Ernest Goff, executive vice president of Associated Spring Corp., Bristol, Conn.

Magnethermic Expands Plant

Magnethermic Corp., Youngstown, has completed a plant addition to house a high-frequency laboratory, offices and manufacturing facilities. The company will manufacture high-frequency electric induction heating units. Previously, it specialized in low-frequency induction heaters used by aluminum, brass and other metallics industries — mainly extrusion presses. P. A. Hassell is manager of the High-Frequency Induction Heating Division.

Wallace Barnes Opens Plant

Wallace Barnes Mfg. Co., Bristol, Conn., opened a plant in Syracuse, N. Y., to produce metal springs and wire forms. M. V. Galgano is manufacturing superintendent.

Harlan Electrical Renamed

Harlan Electrical Construction Co., Cleveland, changed its name to David W. Murray Co. The firm does electrical work for the automotive, steel, power and other industries.

Reynolds Builds on West Coast

Reynolds Metals Co., Louisville, is building a combination sales office and warehouse building at Third and Marin streets, San Francisco. The warehouse portion will be leased to Clingan & Fortier, a distributor for Reynolds in that area.

Motorola Buys Apparatus Firm

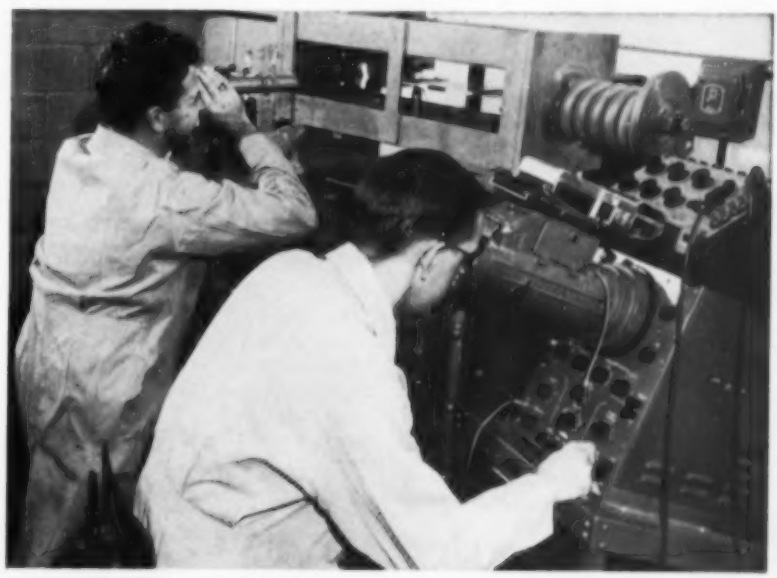
Lee J. Drennan Inc., Arcade, N. Y., manufacturer of radio apparatus, has been sold to Motorola Inc., Chicago, effective Jan. 1. The new owner expects to increase operations at the Arcade plant.

Harvell Mfg. Enlarges Plant

Harvell Mfg. Corp., Hubbard, O., is building an addition to its plant. It will be used mainly as a warehouse. The firm makes steel waste baskets and other household articles.

Superior Tube Forms Division

Superior Tube Co., Norristown, Pa., activated a Mechanical Development Division under the direction of H. W. Cooper at its plant in that city. It is primarily responsible for the mechanical development and engineering of new processes and products. Electronic and



"Two-Way Stretch" Uncovers Jet Engine Blade Flaws

Blades for jet engines are given a "two-way stretch" in this machine to be sure they can meet the rigid requirements of General Electric turbojet engines. Using this tester, engineers simulate the stress and strain put on jet blades in service. The large spring (right) is capable of applying more than 18 tons of horizontal force—similar to that caused by centrifugal force—on the blades; the vibrating section supplies the vertical vibrations—similar to those caused by air passing through compressor sections of the jet engine. Some jet engine blades are capable of withstanding over 30 tons of pressure per square inch

metallurgical development and engineering will continue under the metallurgical department.

Seneca Installs Strip Mill

Seneca Steel Service Inc., Buffalo, is nearing completion of its multimillion dollar expansion program. The project includes installation of a new specialty steel strip mill for rolling cold strip. Production in the new strip mill, which operates with the plant's Warehouse Division, has been increased, but it still is far from capacity levels.

Peerless Broadens Line

Peerless Electric Co. purchased the physical assets of Sherman Electric Co. Inc., both of Warren, O. Peerless also obtained an exclusive license to manufacture and sell all products covered by Sherman patents, covering a number of electronic devices. Alex and Arnold Sherman have joined the Peerless Electric organization to form an Electronic Division.

Eimco Builds Research Center

Eimco Corp., Salt Lake City, Utah, manufacturer of vacuum and pressure filters, established a Research & Development Center, 301 S. Hicks Rd., Palatine, Ill. The center will be devoted to work in the field of liquid-solids separation. It also will house the firm's Central Division sales and engineering offices.

Sage Equipment Expands Plant

Sage Equipment Co., Buffalo, manufacturer of gravity wheel, roller and power conveying equipment, increased its manufacturing space over 30 per cent. The new area is being used for steel stock and shearing departments.

Trailer Plant Opens in South

Springfield Body & Trailer Co., Springfield, Mo., began operations at its Waycross, Ga., plant. Van L. Frazier is general manager. Manufacturing all types of liquid tank trailers, the Waycross plant will use high tensile and stainless steel, aluminum and magnesium.

Atmosphere for Testing

Specialists in the metering laboratory of Ford Research & Engineering Center, Dearborn, Mich., use this giant bell jar to test carburetors. Vacuum pumps produce any desired atmospheric pressure within the apparatus

GE To Build in Toledo

General Electric Co., Schenectady, N. Y., plans to build an industrial apparatus service shop in Toledo, O. It will be geared to meet the added marine business expected from the St. Lawrence Seaway and the growing trend toward automation.

Wolverine Tube Depots Opened

Calumet & Hecla Inc.'s Wolverine Tube Division, Detroit, opened mill depots at Charlotte, N. C., and Dallas. It will stock seamless nonferrous water tube, automotive tube, refrigeration tube and S.P.S. pipe.

Tabor Mfg. Buys Turbo Machine

Tabor Mfg. Co., Philadelphia, manufacturer of foundry molding machines and equipment, has become a division of Turbo Machine Co., Lansdale, Pa. The complete line of Tabor equipment, including molding machines, rollovers, cutoffs and nibblers, will be made in Turbo's Lansdale plant. The purchase involved the trademark, inventories, patents and licenses of Tabor, but did not include the remaining property, chiefly fixed assets. They will be sold at auction. Turbo Machine Co. makes drying, heat-setting, processing and other machinery.

Lummus Co. Enlarges Plant

Lummus Co., New York, is building a major addition to its Honesdale, Pa., plant to house three departments being transferred from New York city. This is the second addition constructed by Lummus since it acquired the former Gurney Elevator Works in 1938.

Manufacturing Service Offered

A contract manufacturing service for machine builders has been established by H. W. Butterworth & Sons Co., Bethayres, Pa., manufacturer of textile machinery. The firm built a plant addition and installed over $300,000 worth of machine tools. These facilities are available to machinery manufacturers who want to retain their own sales organizations. Butterworth will continue to manufacture assemblies, subassemblies and components.

Foundry Gets Army Contract

Continental Foundry & Machine Co., East Chicago, Ind., will build and machine hulls and cast and machine turrets for Army tanks in the $160-million armor contract awarded Chrysler Corp., Detroit.

All the hulls built by Continental and others will be machined in the firm's East Chicago shops. Turrets will be cast and machined at Wheeling, W. Va Continental foundries at Coraopolis, Pa., East Chicago and Wheeling will be engaged in the program.

Fabrite Metals Corp. Formed

Fabrite Metals Corp. has been organized in Pawtucket, R. I., as a metal supply and distributing organization. Among the metals offered are: Aluminum of 99.99 per cent purity; clad bimetals and trimetals; mild steel, electrolytically precoated with brass,

copper, chrome; metals for electronics industry; polished press plates; extrusions and shapes; trim, paneling and forming variations, including embossed, expanded, perforated and meshed stock.

Yale Rubber Expands Plant

Yale Rubber Mfg. Co., Sandusky, Mich., completed an addition to its plant which will house additional laboratories for quality control, new mills and extruders recently installed as part of an expanded extruded and spliced goods department. The firm reports increased demand for metal-to-rubber products.

Rosenblum Acquires Rank Mfg.

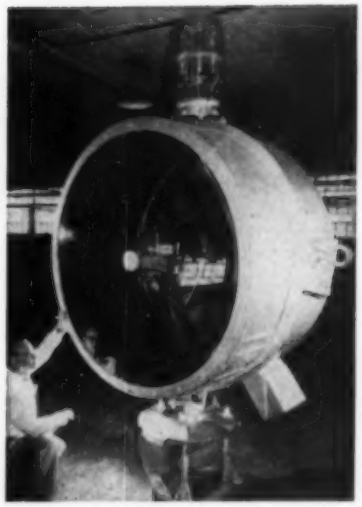
Rosenblum Bros. Co., maker of aluminum awnings, purchased the business and assets of Rank Mfg. Co., producer of decorative grills and ornamental brackets. Rank will operate at its present location for three months, then will be consolidated with Rosenblum operations in its own building. Both are Youngstown firms.

Dr. Pidgeon Honored

Dr. Lloyd M. Pidgeon of the University of Toronto, Toronto, Ont., is the recipient of the first Ambrose Monell Medal for distinguished achievement in mineral technology. The medal is awarded through the Columbia School of Mines, Columbia University, New York. Dr. Pidgeon, discoverer of the process bearing his name for production of metallic magnesium, is active in research on production of such metals as titanium and zirconium.

Borg-Warner Forms Subsidiary

Borg-Warner Corp., Chicago, formed a new manufacturing subsidiary, Morse Chain of Canada Ltd., which will occupy a plant being built at Simcoe, Ont. The Canadian firm will produce automotive and industrial chain under the direction of S. J. Roush, president of Morse Chain Co., an American subsidiary of Borg-Warner. Another Borg-Warner plant, to be operated by Long Mfg. Ltd., a subsidiary, is under construction at Oakville, Ont., and will produce automotive radiators.



Searchlight Turns Civilian

Capable of throwing its beam 120 miles, this searchlight contains a 2500 watt short-arc mercury-vapor discharge lamp that will develop 275 million candlepower. Originally a carbon arc light used as an antiaircraft searchlight during World War II, it was modified by Westinghouse Electric Corp. at its Cleveland plant

Cole Carbide Opens Plant

Cole Carbide Industries, producer of carbide cutting tools, opened its new plant on Ryan road, Royal Oak, Mich. "The trend to automation calls for more effective use of carbide tooling," says O. S. Cole, president. "We're ready to help satisfy the needs accompanying that trend."

NEW ADDRESSES

Niles-Bement-Pond Co.'s Pratt & Whitney Division moved its New York office to 42-19 Main St., Flushing 55, Long Island, N. Y. This office maintains comprehensive stocks of its standard cutting tools and gages.

True Temper Corp., Cleveland, moved its central engineering, industrial engineering and research and development departments to its new building at Geneva, O.

ASSOCIATIONS

C. H. Ker, president, Dalton Foundries Inc., Warsaw, Ind., was elected president of **Gray Iron Founders' Society Inc.**, Cleveland. Other officers: J. W. Simmons Jr., Cox Foundry & Machine Co., Atlanta, vice president; C. H. Meminger, Posey Iron Works Inc., Lancaster, Pa., secretary; W. O. Larson, W. O. Larson Foundry Co., Grafton, O., treasurer.

New directors are: A. M. Nutter, E. L. LeBaron Foundry Co., Brockton, Mass.; W. E. Illig, Banner Iron Works, St. Louis; E. T. White, Bostick Foundry, Lapeer, Mich. Robert Schaefer, Shaefer-Goodnow Foundries Inc., Pittsburgh, is an incumbent.

Directors of **American Society of Tool Engineers**, Detroit, elected Gervais W. Trichel to serve on its research fund committee. Mr. Trichel is experienced in research, its administration and manufacturing. He serves as executive vice president of Amplex Oilite Division, Chrysler Corp., Detroit.

REPRESENTATIVES

Quaker State Metals Co., Lancaster, Pa., appointed Tappan Bros. Inc., Detroit, distributor for its cross corrugated aluminum and galvanized roll roofing in that area.

Eichorn & Melchior have been appointed San Francisco representative for **Feedrail Corp.**, New York, manufacturer of industrial trolley busway electrification systems.

A. H. Nilson Co., machine tool manufacturer, appointed Four States Machine Co. distributor for northern Illinois, western Indiana, southern Wisconsin and eastern Missouri.

Hose Accessories Co., Philadelphia, manufacturer of hose couplings, valves and accessories, appointed Durrie Sales Co., Chicago, as its representative in the Illinois, Indiana and Iowa marketing area.

THEY MAY LOOK ALIKE

...but there's a big difference underneath

And it's the same way in buying carbon or alloy steel tubing. Lots of it looks very much like OSTUCO . . . but underneath it all there are these advantages that save you money:

OSTUCO provides a single source service . . . complete manufacturing, fabricating and forging operations under one roof mean one purchase order takes care of all details. And you can depend on deliveries as promised. OSTUCO'S flexibility assures the same efficiency and economy in both large or small production runs. OSTUCO'S quality control maintains uniformity of structure from raw materials to finished product.

The complete story as outlined in an informative booklet, "OSTUCO Tubing," is yours for the asking. Or better still—for conclusive proof—send us your blueprints for prompt quotation.

OSTUCO TUBING

SEAMLESS AND ELECTRIC WELDED STEEL TUBING —Fabricating and Forging

OHIO SEAMLESS TUBE DIVISION
of Copperweld Steel Company • **SHELBY, OHIO**
Birthplace of the Seamless Steel Tube Industry in America

SALES REPRESENTATIVES: BIRMINGHAM • CHARLOTTE • CHICAGO CLEVELAND • DAYTON • DENVER • DETROIT (Ferndale) • HOUSTON • LOUISVILLE LOS ANGELES (Beverly Hills) • MOLINE • NEW YORK • NORTH KANSAS CITY PHILADELPHIA • PITTSBURGH • RICHMOND • ROCHESTER • ST. LOUIS • ST. PAUL SALT LAKE CITY • SAN FRANCISCO • SEATTLE • TULSA • WICHITA

CANADA, RAILWAY & POWER CORP., LTD.

EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY
117 Liberty Street, New York 6, New York

Technical Outlook

QUICK CURED CORES—Look for announcement of a new company in Columbus, O., which will sell a patented process to cure sand molds and cores in anywhere from 1 to 20 seconds. The European process involves mixing anhydrous silicates with the sand and exposing the compacted forms to a CO_2 gas flow. Reaction is almost instantaneous, and the cores and molds formed are reported excellent for ferrous or nonferrous castings.

SANDWICH IN PLACE—Foamed in place plastics that fill and stabilize hollow sheet metal aircraft parts look a step closer to success. Wright Air Development Center describes an alkyd-isocyanate resin called Epon Adhesive VI which gives good results with aluminum if surfaces are given a sulphuric acid-sodium dichromate cleaning first.

PLASTIC DIE SEALANT—They're using ordinary strippable protective coating for aluminum on a plastic die-making problem. It makes an effective sealant to prevent moisture in plaster casts from seeping into fresh-poured plastic and cuts out much reworking of pits and other imperfections.

INTERMETALLICS—A material whose starting components were 95 per cent Cr_2Ti and 5 per cent chromic oxide shows excellent high-temperature properties, including good oxidation resistance and high stress-to-rupture strength. One test specimen had a rupture life of 355 hours at 12,000 psi and 1800° F.

FORMED IN A FLASH—Still in the research labs but something to watch is flash sintering. Low voltage high amperage current is passed through metal powder held in a nonconductive die. At the same time pressure is applied. With the application of pressure and high heat simultaneously, structures difficult to make by other means can be made literally "in a flash". Cemented titanium carbide, flash sintered in ¼ second, has shown properties equivalent to conventional carbide sintered in vacuum at high temperatures for several hours.

ROLL OVER, REGULUS—Temporarily stymied by the problem of removing minute bits of metal that wedged in out-of-the-way places during assembly of their guided missile Regulus, Chance Vought Aircraft Inc. devised a clever solution. They built a rotating jig much like the spit on your barbecue. A small drill motor turns the missile over and about a handful of metal falls out of each assembly. Now they're working on a vibrator to assist fallout.

BETTER COMMUNICATION—Big plants with operations keyed to fast communications can't afford message tie-ups and complicated dispatching systems. One of the best of the new automatic tube systems hurls plastic message carriers 1155 fpm, whips messages from one station to another directly, without central dispatching desk. Timken Roller Bearing Co. installed the setup in its Canton, O., plant.

LUBRICANT—The Naval Research Laboratory says that dry nylon, because of its high coefficient of friction, is not a suitable solid lubricant. Tests also show that a satisfactory lubricant for nylon gears or bearings is one that will absorb or form a thin film on the nylon surface without attacking the plastic. Most satisfactory wear preventive additives are: Long chain fatty acids, alcohols or amines—because of the absorption requirement.

Metalworking Outlook—p. 27 Market Outlook—p. 93

. . . at BUICK

Waste Treatment Is Tailored to the Job

. . . at MAYTAG

Because of increasing severity of legislation and enforcement, both on the state level and by smaller political subdivisions, industry is spending considerable time and vast sums of money to keep waste products clean. STEEL here summarizes the practical approaches which succeeded for two firms given the opportunity to design treatment systems into new plant facilities. Each system serves a different plant function; each incorporates necessary specialized factors.

JUST as with any other plant service function, the most effective way to design a waste treatment system is in the plant's blueprint stage. Function of Buick's treatment operations at its jet engine assembly plant in Willow Springs, Ill., emphasizes this conclusion.

When the assembly plant site was established, Buick's research department was on the job to work

CONSTRUCTION of new plating facilities gave Maytag Co., Newton, Iowa, opportunity to build in provision for complete treatment of all industrial wastes. Built for automatic flow treatment of industrial waste, the treatment plant design may have been based on a more limited budget than the Buick installation described above, but results appear to be equally effective.

Buick and Maytag had varied waste treatment problems—the former from machining and assembly, the latter from surface finishing. Each now has the right combination

out elements of a trade waste plant that would serve the facility. Even with a fast start, they had to work with some unknowns. Plans called for jet assembly—with perhaps some machining. But quantity of latter operation remained a mystery. To come up with the present system, engineers used a factor developed by Buick for estimating size of disposal plant required.

Workable Factor—With information that assembly and machining would eventually occupy the jet plant, a factor of 0.013 gallon per square foot of manufacturing area was established. Based on a contemplated two-shift assembly and manufacturing operation, to be covered in one shift at the disposal plant, the following data were evolved:

Manufacturing area—642,00 sq ft x factor of 0.013 gallon per sq ft of manufacturing area = 8112 gph.

To dispose of the waste from a 15-hour manufacturing operation in one 7½-hour shift at the disposal plant: 8112 gph x 15 ÷ 7½ = 16,244 gph or 271 gpm.

The plant was designed for a maximum 300 gpm. The collection basin was built for 15 manufacturing hours retention, or about 150,000 gallons. To date flow averages 81,000 gallons per day; it has gone as high as 137,000 gallons a day.

Plant Design—The manufacturing plant has all operations on one floor, with no basement. So sumps were located at strategic points throughout the plant. Schone air lift pumps are used to pump solution to an overhead line, which drops back to floor level at the plant outlet, then travels underground to the disposal plant.

The sumps act as combination dump stations and receiving sumps for processing operations piped to these stations. No other floor drains are available for an accidental dump or spillage of oil or chemicals to the storm sewer. Disposal plant itself was designed around Infilco equipment. Duplicate equipment throughout means breakdown of any single unit will not require a shutdown.

Flow of waste solution through the disposal plant is split to give a flow of 150 gpm through each side, as follows:

1. Solution is received in one of two holding basins, each with 150,000-gallon capacity.
2. Solution is pumped to mixing basin where chemicals are introduced for primary break.
3. Flow is split into two Infilco 150-gpm clarifiers.
4. Solution flows to two Infilco cyclators where chemicals are added for final flocculation and clarification.
5. Outflow from the cyclators joins and flows to storm sewers

Voluminous Sludge—Two mixers in each receiving basin assure uniform mixture. Because only a blending action is desired, mixers operate at very low rpm. Each basin has an oil skimmer. Blending action on each basin is calcu-

The plant's automatic flow-through design treats discharge from all operations, including pickling, bonderizing, porcelainizing, etc., in addition to plating. Another important function is provision for maximum reuse of effluent to plating and other plant operations. Sanitary sewage is still discharged to the city treatment facilities.

Rinse Waters — Rinse waters from two sources—those containing cyanides and hexavalent chromium —flow by gravity into a pair of 55,000-gallon surge and equalizing tanks. From surge tanks, each moves on to two concrete reaction tanks. Latter units are arranged in each case to be operated separately to handle total rinses containing cyanide on the one hand, chromium on the other. They can also be operated in parallel for possible greater future flow, or in series as required. Normal operation on cyanides is oxidation to cyanates; on chromium, reduction of hexavalent to tri-valent.

Provision for batch treatment of both cyanide and chrome rinse waters is also made if need arises. An alternate method of treatment is available for chrome rinse waters by use of ferrous sulphate without pH control. Overflow from all reaction tanks flows to a common neutralization tank.

Dilute Wastes—All other waste waters from processes that contribute no cyanides or chromium, having combined discharge up to 600 gpm, are piped separately after collection to the 9000-gallon neutralization tank. Provision has been made for feeding hydrated lime from a chemical feeder controlled by a pH controller and for feeding ferrous sulphate as a coagulant on a proportional flow basis.

Effluent pH is controlled at 10.0, which assures precipitation of all significant metallic ions. While not included in design, space is allocated for feeding activated silica as a coagulant aid should the need arise. Discharge from the neutralization tank is by gravity to the primary clarifier.

Clarification—For primary clarification of neutralization tank's effluent, an upflow suspended-solids contact basin equipped with hydraulic skimming is incorporated Positive, mechanical sludge removal was an important consideration in its selection.

Provisions have also been made for incorporating equipment for secondary clarification if needed, or for increase of treatment capacity. No equipment is now planned with exception of sludge drainage through a bottom sump. Secondary clarifier will be used as stand-by for the cyclator, as plain sedimentation and as storage of treated water.

Concentrated Wastes—Whenever plating department operations require disposal of concentrated cyanide plating solutions, these wastes are pumped to the concentrated cyanide treatment tank for complete oxidation by the alkaline-chlorination process on a batch

Tailor Waste Treatment To The Job

at BUICK

lated to allow oil accumulation until an efficient skimming job can be done without emulsifying surface oil.

Problem of voluminous sludge, as it is removed by automatic sludge blow-off from cyclators and clarifiers, is solved by two sludge settling tanks that help concentrate the substance before it's pumped to sludge beds.

Area, Equipment — Foundation area for the control building and oil waste holding tanks is about 3744 sq ft. Total floor area in the control building where the laboratory and all other control equipment is located is 875 sq ft.

Total foundation area for both clarifiers and both cyclators is about 1720 sq ft. The four sludge drying beds cover a total area of approximately 3440 sq ft.

All controls are concentrated on one panel, with accompanying lights to indicate which pumps, motors and feeders are operating. Lockout start and stop switches at each electrified unit provide for safety and repair. Seven coats of Amercoat paint were specified on all concrete and steel equipment, except on the two holding basins and sludge settling tanks, which are bitumastic coated.

A Few Problems—Among difficulties experienced was a failure in an attempt to employ electrodes in the oil storage tank to keep the subnatant water pumped out. Electrodes coated over with oil almost immediately and after repeated attempts to keep them clean, the system was abandoned. Alternate system of pumping out water into one of the waste holding basins and observing visually when the oil line is reached now is used.

Most problems stem from sludge formation. In one instance, a tar-like sludge is forming in the bottom of the cyclator. When samples of the sludge from jar tests covering several days were mixed and allowed to stand, the same substance formed in the beaker. Future difficulty is expected from this problem.

Average Oil Content—Final effluent has average oil content of less than 15 ppm; pH varies from 10 to 11.8. Object is to maintain a pH of less than 10.5, but it's been determined that clarity of the final effluent cannot be maintained consistently at this low pH. However, total alkalinity is very low. Combined effluent from oil disposal and sewage plants has been below 9 with a minimum 7.9 pH. Effluents from these plants join a short distance from the oil disposal plant and flow to the DesPlaines river in a sewer.

Cost of treating 1000 gallons of waste solution has varied from 7½ to 15 cents with an average of 1800 gallons of oil per month recovered.

at MAYTAG

basis. After cyanide is completely oxidized and the metals precipitated, waste is discharged to sludge holding tanks.

Spent acids, such as from pickling, plating or other operations, will be pumped to a holding tank for treatment. It is unlikely that concentrated chromic acid will be discharged for disposal because evaporation equipment installed in the plating can take care of recovery and reuse.

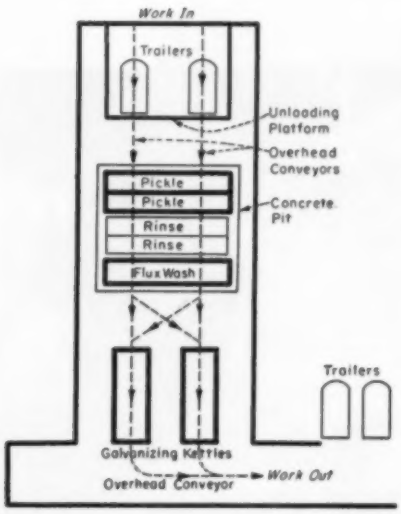
Sludge Disposal — All sludge formed as a result of any treatment process, whether in primary clarification cycle or from treatment of concentrated wastes, is discharged to one of three 11,600-gallon sludge holding tanks. Three tanks have been incorporated, one for sludge collection during each shift, thereby allowing at least 16 hours' concentration by settling prior to decantation of the supernatant water and before filtration of the sludge.

Sludge is pumped to a vacuum filter with an effective filtration area of 100 sq ft. Sludge cake is then discharged directly into a Dempster collector for disposal.

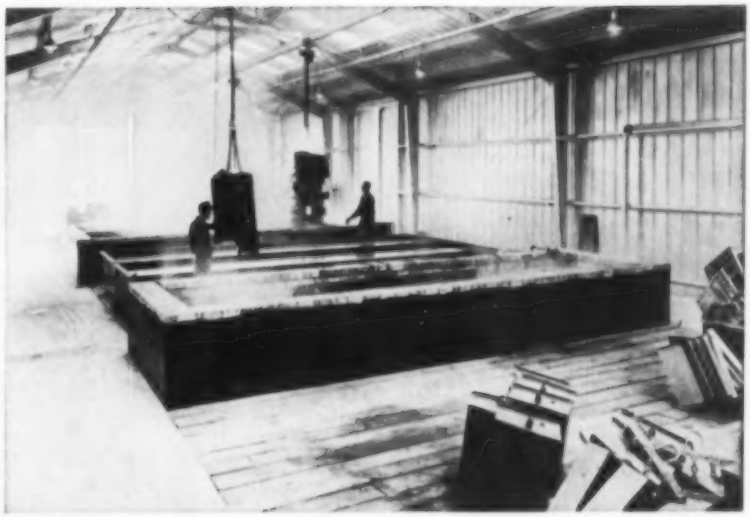
Water Reclamation — Relatively high cost of city water, coupled with its high hardness, led design of treatment plant for maximum practical amount of return of softened effluent to plant processes. Hardness in the city water creates excessive maintenance costs, particularly in scaling of heat exchange equipment. In certain rinse operations, high hardness also creates difficulties as a result of its reaction with phosphate cleaners.

Thus, plant was designed to incorporate alkalinity reduction, hardness removal for treatment plant effluent and sodium zeolite softening of all city water.

Demineralization—Demineralized water is provided for make-up water for all chemical solutions. In use is a two-bed system with styrene resin for the cation exchanger, a weak-base resin for the anion exchanger. This is followed by a forced-air, aluminum degasifier with Raschig rings for removal of the liberated carbon monoxide. Demineralized and degasified water flows by gravity to a 20,000-gallon storage tank, is then pumped to a Ucilon-coated pressure tank for subsequent use.



Efficient inline layout speeds work



Two lines move through same set of tanks

Galvanizing Line in a Hurry

When Quick Industries Inc. built a new galvanizing shop the company lived up to its name. Extra tanks and no pre-storage keep work moving

EFFICIENCY has doubled output in a Jackson, Mich., galvanizing shop. Six men handle production of 2500 to 3000 lb an hour, including pick up and delivery. It formerly took five men to do just half as much work.

How Quick Industries Inc. lives up to its name is a lesson in smart planning. With equipment supplier Hanson-Van Winkle-Munning Co., Matawan, N. J., the company worked out a scheme for a new galvanizing plant that gets materials in and out with a minimum of handling.

Trucks the Key—Quick does its own pick up and delivery with its fleet of trailer trucks. They are an integral part of the plant.

Work moves from the trailers directly into the line and out onto trailers at the other end. Trailers are not unloaded until work is ready for processing, so there's no pre-storage.

Straight Through — The operation is strictly in line—actually two parallel lines sharing one set of preparation tanks and two galvanizing kettles.

At present, the plant is using only one galvanizing kettle, but the second is being installed. When it is in operation, four men will be added and production capacity will jump to 8000 lb an hour.

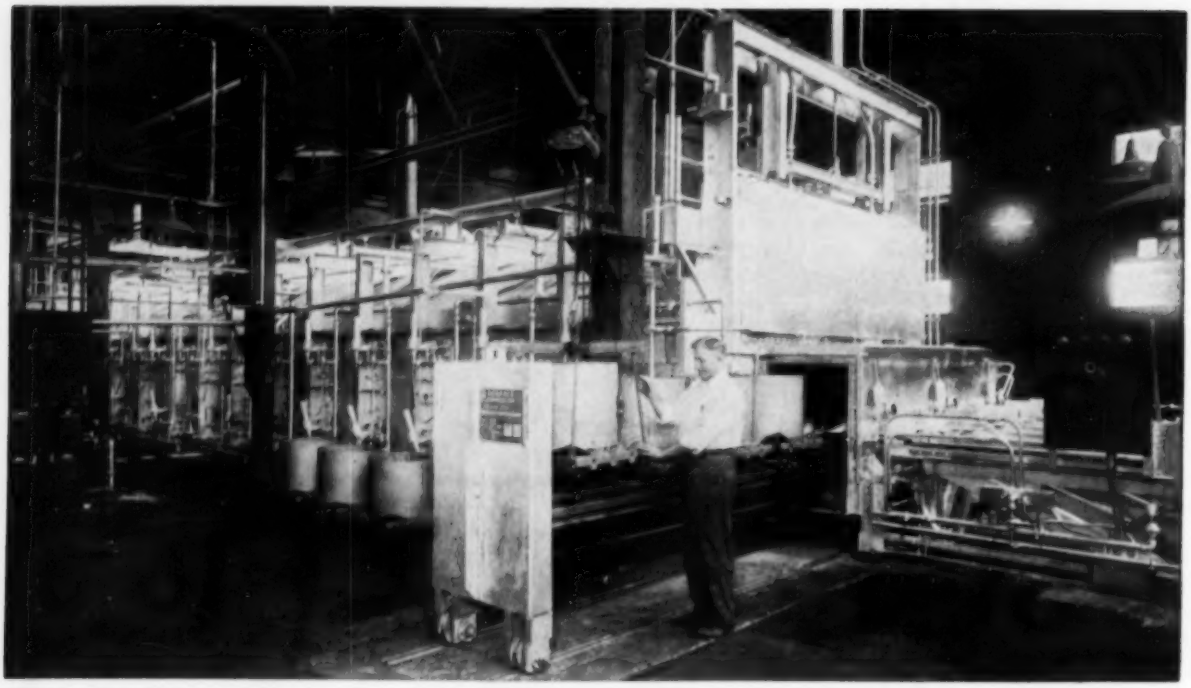
Equipment—Flow is designed for no delays. In line are five 22-ft tanks—2 pickle, 2 rinse and 1 flux wash. Two tanks for pickling allow constant operation while acid in one tank is being replenished. Double rinse cuts contamination for the flux-wash bath.

Galvanizing kettles are heated by natural gas. A pyrometer control maintains the zinc at 850°F. Another control prevents heat from going over 880°F if the first fails.

Handling—Typical work handled includes mild sheet steel assemblies, pipe coils, pole line hardware, tanks and structural steel units. Eleven 1-ton electric hoists on monorails move work through the line. An air-operated jib crane handles work in the zinc bath, but there's an electrically-operated reel for emergencies.

Work coming off the line goes into tote boxes or onto pallets. Fork lift trucks handle it from here to storage or the shipping dock.

DID YOU MISS these articles on galvanizing which appeared during the year in STEEL? 1. *Modern Practice of Hot Dip Galvanizing*, Feb. 22, Mar. 1, Mar. 8; 2. *Continuous Galvanizing Line*, Apr. 5 and 12; 3. *How To Avoid Galvanizing Embrittlement*, Nov. 22. A few reprints are still available.



Radiant tube-fired malleablizing furnace, used for annealing valves and fittings

Part II—Controlled Atmosphere Heat

Carburizing, dry cyaniding, malleablizing, carbon restoration, gas pickling—these are processes in which controlled gas atmospheres are paying off

This is the concluding installment of a two-part article. Part I appeared in the November 22 issue of STEEL, and covered the chemistry of heat treating atmospheres, controlled atmosphere furnaces and bright hardening.

GAS CARBURIZING is the most important single application of controlled atmosphere heat treating. A versatile technique for production man and metallurgist, it offers improved product quality, elimination of manual labor, and over-all cost reduction.

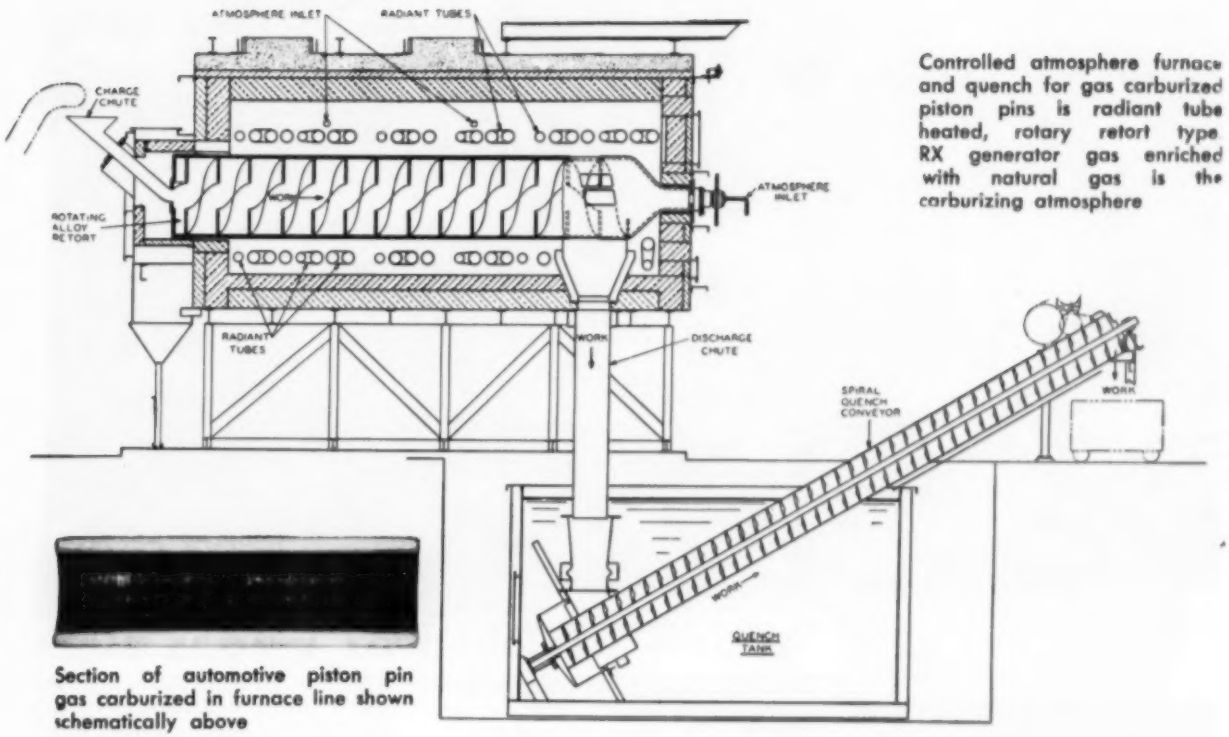
Its significant advantages over alternative methods, such as pack carburizing, are:

1. The job of packing parts in carburizing boxes with compound is eliminated. This saves manual labor.
2. Heating efficiency is increased and fuel is conserved. There is no need to heat carburizing compound and container.
3. Closer control of case depth is possible because atmosphere around the work may be controlled in every stage at the desired carbon potential.
4. Manual handling in unpacking boxes is eliminated, and work can be quenched directly from the furnace. In many cases this means the elimination of reheating and quenching.

Case History—An example of improvements made possible by gas carburizing is in the manufacture of automotive piston pins.

Piston pin is made of AISI 1117 steel. It was formerly pack carburized at 1680°F to give a total case of 0.030 to 0.040 in. after grinding. Parts are now gas carburized in a rotary retort controlled atmosphere furnace at 1700°F.

Steps—This radiant tube heated furnace carburizes 100 per cent of the piston pin surface. Work is quenched directly from the furnace through 2 to 3 per cent



Controlled atmosphere furnace and quench for gas carburized piston pins is radiant tube heated, rotary retort type. RX generator gas enriched with natural gas is the carburizing atmosphere

Section of automotive piston pin gas carburized in furnace line shown schematically above

Treating

By HENRY M. HEYN
Surface Combustion Corp.
Toledo, O.

caustic solution. Change-over to gas carburizing eliminated three heat treating operations needed to get the same hardened case.

Over-all cost for manufacturing has been substantially reduced. Work quality and uniformity have improved. Atmosphere supplied by an RX gas generator is enriched with natural gas to attain the carbon potential.

Homogeneous Carburizing—This is one of the newer heat treating processes. It offers considerable promise for cost reduction and for parts otherwise unsuited to mass processing.

Homogeneous carburizing raises the carbon content of a low carbon steel uniformly to medium or high carbon level throughout the section. For example, a 1010 steel may be modified to a 0.50 or 0.80 per cent carbon steel. Parts processed range from small caliber cartridge cases to fasteners.

Ways and Means — Equipment for homogeneous carburizing is similar to that for carbon restoration and case carburizing. RX generator gas enriched by natural gas or propane is used as the atmosphere. The carbon potential of the atmosphere must be controlled.

With the process, the metal fabricator can take advantage of the ease of forming low carbon steel. He then transforms the low carbon part to a high carbon steel. Important economies in die life and die cost are possible.

Dry Cyaniding—Equipment for dry cyaniding is similar to that for carburizing. Almost any furnace suitable for gas carburizing and having cooling or quenching facilities is satisfactory. The atmosphere used is a gas (RX generator gas for example) enriched with a hydrocarbon, such as natural gas or propane, and comparatively small amounts of anhydrous ammonia.

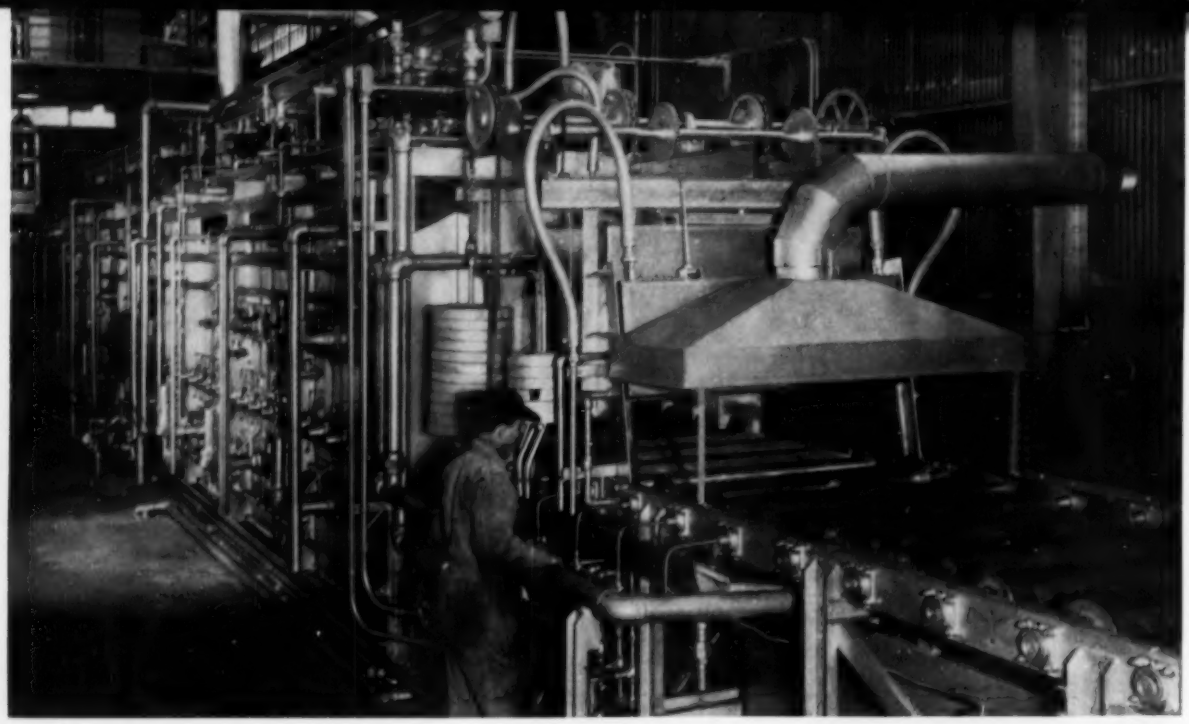
Dry cyaniding or carbonitriding gives a thin, hard case rich in carbon and nitrogen. It is used for parts such as gears, washers, stampings, bushings and valve lifters. Almost any carburizing grade of steel is suitable.

Temperatures—Process is usually carried out at temperatures on the order of 1500 to 1600°F. Parts may be cooled in atmosphere or quenched in oil or water.

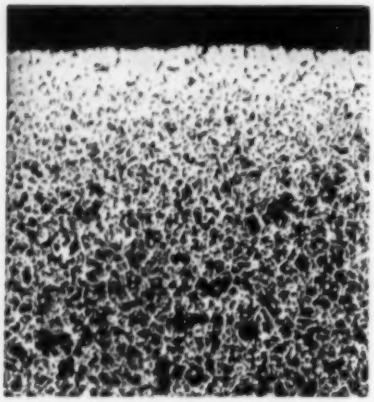
Since low controlled atmosphere cooling often develops required surface hardness in the work, it is employed for parts subject to distortion or warping. Liquid quenching in oil or water is used for maximum hardness. If work is atmosphere cooled or water quenched, washing can be eliminated.

Malleablizing—In annealing, to convert white iron to the malleable form, a number of atmospheres are used. They range from the atmosphere produced by the metal itself to reducing, carbon-controlled atmospheres.

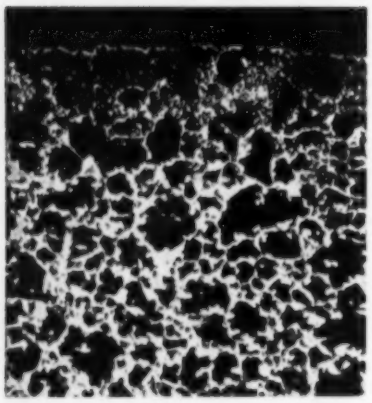
Where the atmosphere from combined carbon in the iron is used, a recent development is to bleed in metered amounts of air. This reduces carburizing tenden-



Roller hearth furnace used for continuous carbon restoration annealing of cold-rolled bar stock



Before



After

Photomicrographs (75x) showing effects of carbon restoration annealing of cold finished C-1045 steel in furnace shown above

cies, but is practical only for standard black heart malleable iron annealing. Producers of pearlitic malleable iron use endothermic gases, such as RX generator gas, to prevent surface carbon depletion during malleablizing.

Scaling Stopped — Atmosphere control in malleablizing is accomplished by radiant tube heating furnaces. In both pearlitic and black heart malleable production, the prime function of the atmosphere is to eliminate scaling without interfering with malleablizing. By control of heating cycle and furnace atmosphere, malleablizing processes have been shortened from a week or more to as little as 24 hours.

Restored — A new horizon of economy and product upgrading is open to steel mills and steel processors through carbon restoration. Mills can improve cold finished steel to the quality equivalent of centerless ground stock, with less expense.

Carbon restoration uses controlled atmospheres, RX generator gas for example, with an enriched hydrocarbon to restore to cold-finished steel the carbon depleted in hot rolling.

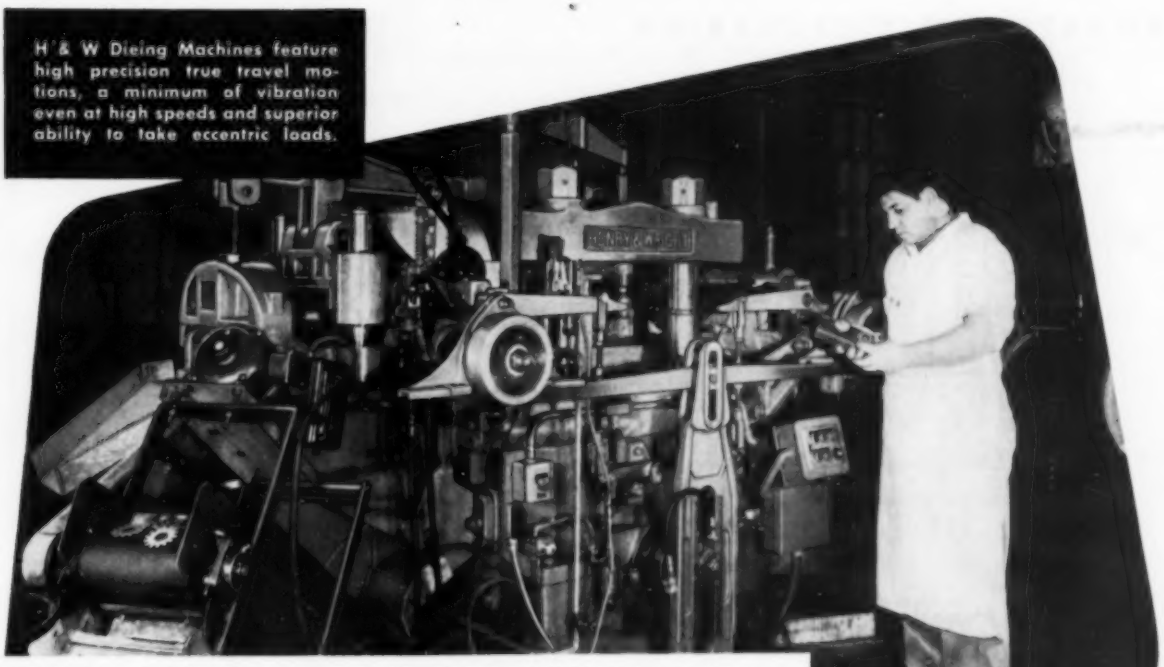
It is used by steel mills and manufacturers of top quality bolts and nuts, where it permits economical practices such as thread rolling. Without carbon restoration, it would be necessary to remove decarburized skin before rolling threads or require the use of centerless ground stock.

Gas Pickling — Controlled atmospheres are the basis for dry or gas pickling of steel before processes such as galvanizing. Gas pickling removes oxides and other surface impurities from steel strip. They are converted to vaporized chlorides by reaction of the steel with hydrogen chloride gas at elevated temperatures during annealing.

Temperatures range from 1100 to 1350°F. The process requires a tight furnace similar to that used for other controlled atmosphere heat treatments.

Dry vs. Wet—Gas pickling is in operation on continuous galvanizing lines in the steel industry. Compared to conventional wet pickling here are some advantages: 1. It eliminates washing, neutralizing and fluxing steps which normally follow wet pickling. 2. By eliminating these steps, much handling is avoided and valuable floor space is conserved in the mill. 3. There are no waste disposal problems.

H & W Dieing Machines feature high precision true travel motions, a minimum of vibration even at high speeds and superior ability to take eccentric loads.



RUNS FROM 1 TO 1,000,000 PIECES

Parts like these, and three changeovers per day, too!

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Production runs are from 1 to 1,000,000 pieces. Alloys, stock sizes, toolings differ for nearly every run. Yet Henry & Wright Dieing Machines in the plant of Wallace Barnes Company, Bristol, Conn., take care of this with nary a need to carry any of the production in stock.

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Precision is high. Hence, spoiled work scrap is low.

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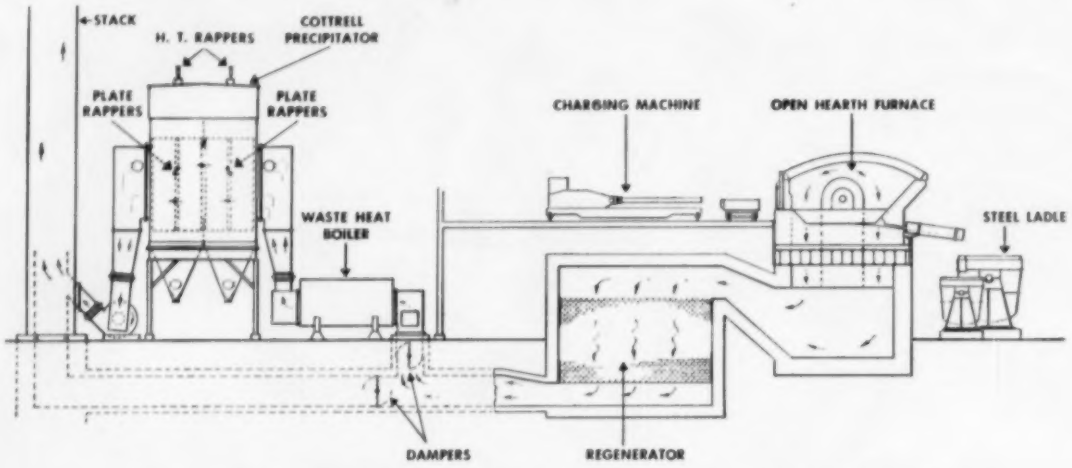


Arrangement of precipitator for cleaning waste gases from open-hearth furnace

Survey of Smoke Control PART II

Precipitators serving Pacific Coast open-hearth shop greatly reduce dust emission. Descalers, slab and blooming mills also get a cleanup

By ROGER A. RENWANZ and SCHAEFFER E. SPECHT
Engineers
Research Corp.
Bound Brook, N. J.

ONE of the important new uses of electrical precipitators is the cleaning of open-hearth gases. The material is fine. Concentration of solids varies widely, depending on the type of operation in the furnace. For example, at the Torrance, Calif., Works of Columbia-Geneva Steel, concentration varied from 0.18 to 0.44-grain per cu ft during melting. In the waste heat boiler lancing period, concentrations increased to 1.2 to 1.55, and during the working period averaged 0.4-grain.

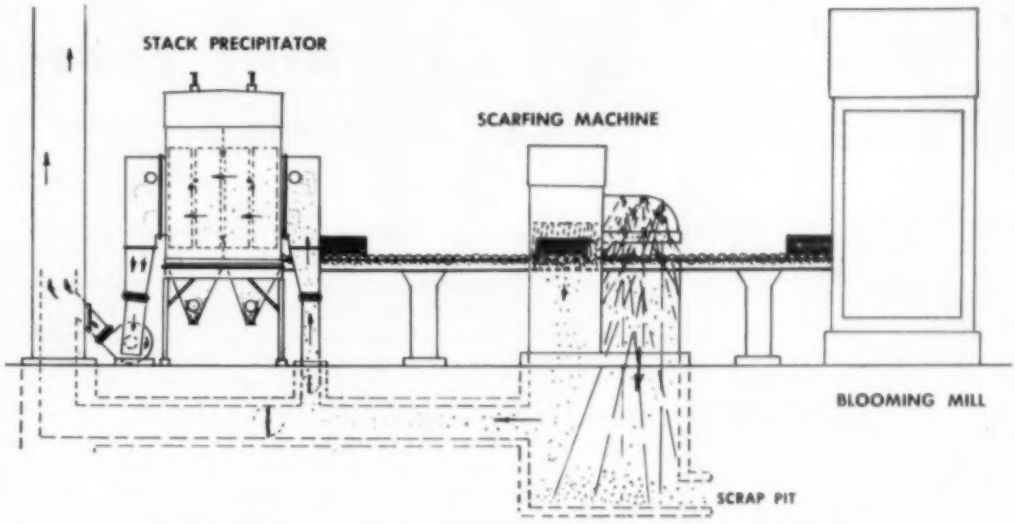
The first installation at the Torrance Works was made in 1950. Its success was such that three additional units were added. The problem involved cleaning combustion gases from oil or gas-fired furnaces. The gases in traversing the furnace acquired metallic oxides in suspension. The material collected is a heterogeneous chemical mixture consisting largely of zinc, iron, lead and sulphur. The suspended material, being a result of the fuming operation is relatively fine, as shown below.

Particle Size Distribution

Microns	Per-Cent
1.0 to 3.0	7.3
0.5 to 1.0	28.4
0.15 to 0.5	49.5
−0.15	14.8

Stack dust discharges of 75 lb average to 245 lb per hour maximum from each of the 58-ton open-hearth furnaces were reduced by the precipitators to an hourly average of 2.02 lb.

Type Equipment Involved—The Torrance Works installation, a standard steel collecting plate, horizontal flow fly ash type precipitator, represents the most common type in use. A waste-heat boiler of about 10,000 lb per hour capacity and an induced draft fan serve each furnace. Plate rappers are of the magnetic impulse continuous operating type, and the high-tension rappers are pneumatic vibrators operating on a time cycle. Dust emission was reduced from 75 to 2.02 lb per hour.



Precipitators now are used for removing fine particles at scarfing machines

The installation incorporated what might be termed a unit system principle: A separate precipitator was provided for each open hearth. While such an arrangement is satisfactory, studies indicate it might be desirable in terms of cost and operation to combine gases from a number of furnaces and treat them in a central cleaning plant. Combining gases would tend to act as a leveling influence, resulting in more uniform gas and dust conditions over the furnace cycles. The arrangement is entirely practical and should be considered in analyzing future open-hearth dust recovery problems.

Other open-hearth precipitator installations have proved efficient, which warrants the belief that the open-hearth shop will become a major application.

Efficiency Exceeds 95 Per Cent—The first precipitator used for the recovery of dust from the combustion gases from iron ore sintering machines was placed in operation about two years ago at the Wenonah Works, Tennessee Coal & Iron Division, U. S. Steel Corp. Because dust in the gases from these machines contains about 65 per cent minus 44 micron particles, the precipitator was placed after a mechanical collector to reduce the amount of dust discharged to atmosphere. With the precipitator operating in series with the mechanical collector, efficiency exceeded 95 per cent, equivalent to an outlet concentration of 0.05-grain per standard cu ft of gas.

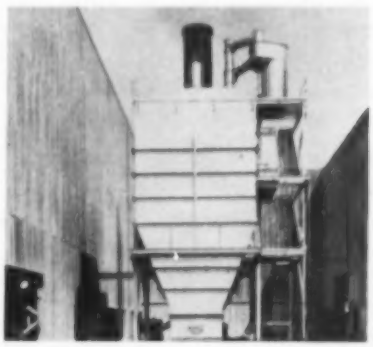
The precipitator is a horizontal flow plate type, which discharges the cleaned gases to the atmosphere through an individual stub stack on each precipitator. Recovery is unique. Much of the dust recovered is previously collected in gas cleaning equipment elsewhere in the plant. A large amount of sintering feed is obtained from the dust catchers and precipitators operating on the blast furnace gas cleaning system.

Another new application of precipitators is at the hot scarfing machine where the horizontal flow type is used to remove fine particles from the ventilating system. Two precipitators serve a scarfing installation: one on a 45-in. slabbing mill and another on a 40-in. blooming mill.

Steps Involved in Operation—Slabs from the slabbing mill are conveyed to the stationary scarfing machine, where they are preheated with oxygen and acetylene for about three seconds, after which the scarfing operation begins. The slabs pass the cutting torches at 80 to 120 fpm. A cut of about 1/16 in. is made on two sides of the slab. The sparks and fume are blown downward by compressed air toward a target plate which is continuously sprayed with water.

During the cutting operation, a coarse spray of water is introduced immediately after the gas nozzles to break up the larger chips and wet the fume. The fume is taken through underground ducts to the precipitator where the clean gases are passed through a fan and exhausted to atmosphere through a steel stack. The installation and operation of a precipitator on the blooming mill scarfing machine is similar.

In normal practice the cupola is charged with pig and/or scrap



Precipitator installation which serves scarfing machines at Morrisville, Pa.

iron, coke and limestone. Blast air for combustion is blown in through tuyeres, near the bottom. High temperatures in the melting zone vaporize a part of the charge. This vapor later condenses as fume particles when the gases are cooled.

Composition of Dust—In addition, particles of dust are picked up by the gases as they pass through the charge. As a result the material to be removed from the gas consists of a mixture of fume and dust particles composed primarily of oxides of iron and silica with small amounts of carbon and oxides of magnesium, aluminum, manganese and calcium. Secondary combustion is produced by gases leaving the charge and air entering through the charging door. Gases are handled in either of two ways:

1—In the cold blast system, the cupola stack is capped and the gases that normally would be discharged are drawn off and conducted to the cleaning equipment. Temperatures at the cupola exit usually range from 1200 to 2000°F.

2—In the hot blast system, air preheaters are used to preheat the blast air for the cupola. The combustion gases from the cupola furnish the heat for the air preheaters. The cupola stack is capped and the gases are drawn off and sent from the preheaters to the cleaning equipment. Temperatures at the outlet of the preheaters range from 500 to 800°F.

In both the hot and cold blast systems the gas cleaning equipment is substantially the same. In both cases it is necessary to pass the gas through spray cooling towers. This reduces temperatures to about 300 to 400°F and also increases the moisture content of the gas.

One cupola precipitator installation stipulated that stack emission was to be held within the following limits:

Iron output, tons/hr	14	12	10
Coke ratio, tons iron:tons coke	8:1	8:1	8:1
Gas vol., chamber inlet, cfm at 1500° F.....	45,600	39,100	32,500
Stack emission, lb/hr ..	23	20	17.5

These conditions were met, and the density of the omission was reduced to less than No. 2 Ringlemann.

MACHINE TOPICS

By R. F. HUBER, *Machine Tool Editor*

TALK enough to any machine tool builder and the subject will eventually turn to next September's machine tool show. It's the biggest thing to hit the industry in years.

One of the reasons for the excitement is that it's the first show for the industry since 1947. There's always some excitement connected with a production—and this show will be just that in every sense of the word.

And What—Not only that, it probably will be the biggest job for next year. Companies are about to tie up many of their key-men and their favorite dollars on making the exhibits right. The third and biggest single factor behind this enthusiasm for the show is the genuine belief that it couldn't have been timed better. It comes when all business is highly competitive. Both the machine tool user and the builder is either beating out his competitor or he's getting backed up against the wall.

Matter Of Pride—The answer, then, is to put the latest products and improvements on display in Chicago at the show—to have them running—and to have a vast supply of information on how the machine, device or gimmick will make money for the user.

At the annual meeting of the National Machine Tool Builders' Association this month, W. E. Rutz, Chairman of the Association's show committee and executive vice president, Giddings & Lewis, outlined some of the work which has already gone into the show.

Where?—Thinking of the site itself was no small problem. First came the space requiremets. The Dodge-Chicago plant, site of the 1947 show, is no longer available. The International Amphitheatre offered adequate space requirements, but only with an addition which is now completed. Such considerations as hotel accommodations, floor - load capacity, ceiling height and others entered into the problem before the final decision could be made.

Power—A new high tension line from the central manufacturing district power plant will bring in enough power to run the machines. Total connected horsepower will be about 60,000 kva, the largest load of any building in the world. Special transformers and lines will be installed to carry it.

Present plans call also for several lunch stands, travel service, translators for overseas guests, a postoffice, telegraph office, housing bureau and guides.

As evidence of what they are going to try to prove to visitors, they've selected "the world's best investment in action" as their theme.

Proportions

According to Tell Berna, general manager of the National Machine Tool Builders' Association, reports show the machine tool business is split about like this: 14 per cent of current new orders are for defense; foreign orders take about 9 per cent; and the remaining 77 per cent is going to domestic peace-time business.

QUALITY

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cold-rolled strip steel

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HIGH-CARBON STRIP

N-A-X HIGH-TENSILE STRIP

The unvarying uniformity of Weirton quality is the result of superior equipment and complete control from mine to finished product. Expert metallurgists, chemists and engineers subject Weirton cold-rolled strip to hundreds of complex tests and checks to assure the high quality that simplifies production and lowers costs. The next time your plans call for cold-rolled strip steel—call Weirton!

WEIRTON STEEL COMPANY

Weirton, West Virginia

NATIONAL STEEL CORPORATION

TABLE 5
Notched and Unnotched Endurance Limit 0.050-in. Notch

Material	Composition, per cent C	Si	Mn	P	S	Ni	Cr	Mo	Mg	Heat Treatment
Forged Steel	0.42	0.31	0.70	0.055	0.037	—	—	—	—	Quenched & Tempered
Cast Steel	0.32	0.45	0.62	0.026	0.032	0.09	0.04	0.06	—	
S.G. Iron	3.48	2.15	0.51	0.12	0.008	1.78	—	—	0.08	Annealed
Malleable Iron**	—	—	—	—	—	—	—	—	—	Annealed
Class 70 Acicular Gray Iron	2.92	1.43	1.00	0.60	—	2.44	—	1.02	—	
Class 50 Gray Iron	2.88	1.38	0.98	0.078	0.064	1.55	0.37	0.53	—	

Material	Tensile Properties Tensile Strength psi	Yield Point psi	Elongation %	Red. of Area %	Brinell Hardness
Forged Steel	80,100	44,600	24.5	32.7	—
Cast Steel	70,750	43,750	18.5	27.2	137
S.G. Iron	71,500	51,200	8.0	—	170
Malleable Iron**	54,600	—	—	—	—
Class 70 Acicular Gray Iron	73,900	—	—	—	—
Class 50 Gray Iron	48,800	—	—	—	218

Material	Endurance Limit Unnotched psi	Notched psi	E. L./T. S. Unnotched Ratio	E. L./T. S. Notch Ratio	% Red. of E. L. Due to Notch	K*
Forged Steel	35,000	17,800	0.44	0.22	49.0	1.96
Cast Steel	24,000	19,000	0.33	0.26	20.8	1.26
S.G. Iron	24,000	18,500	0.34	0.26	23.0	1.30
Malleable Iron**	31,650	18,900	0.57	0.35	0.40	1.63
Class 70 Acicular Gray Iron	26,000	17,000	0.35	0.23	34.5	1.53
Class 50 Gray Iron	16,000	13,000	0.34	0.265	18.8	1.23

$$*K = \frac{\text{Endurance Limit of Unnotched Specimen}}{\text{Endurance Limit of Notched Specimen}}$$

**Malleable Iron Facts. Bulletin No. 44, Malleable Founder's Society, Cleveland

What Are Their Performance Limits?

These limits dictate the metals' use. Part 3 provides an interpretation of procedures and data you'll find essential for getting the right metal on the job

By T. E. EAGAN
Chief Research Metallurgist
Cooper-Bessemer Corp.
Mt. Vernon, O.

YOU must interpret the compression strength of cast materials. With ductile types, usable compression strength generally is designated as the yield point or that point at which a permanent set takes place.

In the case of cast steel and malleable iron, the usable compression strength is the yield point of the respective materials. S. G. iron presents difficulties in the interpretation of compression strength. Compression strength of annealed materials again is the yield point. Our tests show this is true if the material has a minimum 5 per cent elongation. When elongation is under 5 per cent, it begins to act like nonductile materials, compression strength is much higher than yield strength and is sometimes considerably higher than tensile strength.

Gray iron compression strength is much higher than its tensile strength—about three times as high for the higher strength (class 40, 50 and 60) irons and five times as high for lower tensile material. An iron with a 20,000 psi tensile will have a compression strength of 90,000 to 110,000 psi;

one with 50,000 psi will have a compression of 140,000 to 160,000 psi.

Modulus of elasticity of these materials in compression is about the same as that in tension.

Fatigue Limit — Dynamically-stressed parts generally are designed using the fatigue or endurance limit as the controlling factor in the choice of materials. Fatigue life also may be used. There's a distinction between fatigue limit and fatigue life: The former is the value of stress, which, when applied dynamically, gives infinite life; the latter is stress value that will give a finite life under dynamic stress.

Many factors affect the fatigue limit. Examples are notches, internal stress, size and type of testing machine, finish of the test piece. Although elimination of all these is difficult, ASTM has standardized procedure in its "Manual on Fatigue Testing" to give consistent results.

Fatigue limit values show a relation of endurance limit to tensile strength, known as the endurance ratio. This ratio applies to the endurance limit unnotched and determined under ideal conditions (Table 4). We seldom design structures free from notches. Even if we eliminate many bad effects of notches, cast materials still have certain flaws that act as notches. So it's almost a necessity to use the notched endurance limit as your guide in design.

Endurance Factors — Several things affect the notched endurance limit. ASTM's fatigue testing manual lists:

1. The material and its condition (heat treatment, aging, etc.).
2. Condition of the surface.
3. Type and severity of notch.
4. Kind of loading (bending, axial torsion, etc.).
5. Lifetime at which it's evaluated.
6. Almost any other testing conditions (temperature, corrosion, etc.).

Compare the effect of notches on the fatigue limit in reverse bending, tested on the same machine, using 1 in. diameter test pieces and a 0.050-in. notch. Results are given in Table 5.

Relative Sensitivity — Of course, gray iron is not affected as seriously by notches. The lower the tensile strength of the iron the less notch sensitive it is. A 20,000 psi tensile strength gray iron will have a concentration factor (k) of 1.00; at 50,000 psi, about 1.25.

The higher the tensile strength of cast steel, the more it's affected by notches. In "Prevention of the Failure of Metals Under Repeated Stress," it's stressed that if notches must be present, there's little to be gained by raising the tensile above 125,000 psi to 150,000 psi. The increased endurance limit on smooth bars is neutralized by increased notch sensitivity.

Steps to relieve the effect of stress concentrations, such as contouring, shot blasting or rolling of the surface, have overcome some of the effect of notches and increased fatigue life. But they do not necessarily improve fatigue limit.

Impact Strength—In the past, considerable emphasis has been placed on notched bar impact strength. Impact strength depends not only on strength and ductility of the material but also on the speed of impact. The latter is considered a measure of toughness.

Of course, under normal conditions most structures aren't subjected to the impact of a Charpy or Izod test specimen—nor will the same notches be used for these specimens. Impact results cannot be used in design calculations, except in low-temperature service or other special instances.

Wear Resistance—Wear resistance is important to engine builders. Several different types of wear require different treatments. The more important: Metal-to-metal wear as experienced in cylinder and cylinder-liner; abrasive wear that can be experienced in cylinders and cylinder-liner wear but is most often associated with handling or treatment of abrasive materials, such as sand; and contact wear, such as experienced in gears.

Gray iron is a specific in metal-to-metal wear. Not all grades and kinds of gray iron can be used. It should be A48, class 40 or above with random flake graphite and a

TABLE 4

Endurance Ratio of Materials

Cast Steel (All Specifications)	.40-.50
S.G. Iron (All Specifications)	.30-.44
Malleable Iron	.40-.50*
Gray Iron	.35-.50**

*Taken from limited data.
**Heavy sections show .35.

TABLE 6

Costs are tangible in any company or plant. Their confidential nature makes comparative figures impossible, but the following order of increasing cost usually is accurate:

1. Gray Iron	Class 20 to 35
2. Gray Iron	Class 35 to 50
3. Gray Iron	Class 50 to 60
4. Malleable Iron	
5. S.G. Iron	As-Cast
6. S.G. Iron	Annealed
7. Cast Steel	Specification A27
8. Cast Steel	Specification A148

The only safe way to compare costs is to do it on one particular design or pattern.

matrix of 100 per cent pearlite. This type structure usually has a Brinell hardness of over 180.

Some alloys, particularly copper when it is the sole alloying agent, are detrimental to wear even when the desired microstructure is obtained. Use of alloys such as nickel, chromium and molybdenum increases resistance to wear.

Hardening gray iron cylinders increases wear resistance. However, the same microstructure requirements before hardening are required to get the best results. Abrasive wear is also better resisted by the hardened surface. Of course, hardening requires heat treating, which ups the cost of the piece.

S. G. Iron Wear—Claims have been made that S. G. iron has excellent wear resistance. There's little evidence to justify them. Because malleable iron has poor wear resistance, it would be expected that annealed S.G. iron (A339, grade 60-45-10) would be in the same category. You can expect good wear resistance: 1. If material is used in the as-cast (A339, grade 80-60-03) condition and care taken that the analysis is such that the matrix is 100 per cent pearlite. 2. If the surface is hardened.

We have several compressor liners made of S.G. iron in service. It will be several years before we can definitely state wear resistance.

Corrosive Conditions — Where conditions are highly corrosive, liners made of austenitic gray iron (Ni-Resist) can do a good job. This type material gives a good account of itself in all wear conditions. But the cost of producing it and the tight nickel supply preclude its use except in special cases.

Abrasive Wear — Where true abrasive wear is encountered, use of chilled iron or some of the highly-alloyed irons and steels is advisable. The cast iron usually is known as Ni-Hard. Cast steels are usually the hardened, high chromium, high-carbon type.

Fatigue—The third type of wear perhaps shouldn't be classified as such. Failures experienced usually are fatigue and not wear. High-notched fatigue strength generally is required in a proper design.

Gears, of course, are made of many grades of cast steel, S.G. iron and gray iron, depending on service requirements. Special knowledge of gear design and service conditions is required for proper specification of material. Some gears are made of alloy steel and are used in the relatively soft condition; others at least have their teeth flame or induction-hardened.

Elevated Temperatures — Many engineering grades of cast steel, both ASTM A27 and A148 and some of the special specifications listed, are used for elevated temperature service up to about 1000° F. ASME's boiler code lists maximum allowable stresses for carbon steel castings. For temperature over 750° F, low-alloy steels are preferred.

Little is known about the elevated temperature properties of S.G. iron. But it has good resistance to growth and fair scale resistance. This makes this type material excellent for use where alternating heating and cooling is experienced. Examples are furnace doors and ingot molds. There is indication that this quality of S.G. iron will become useful for diesel and gas engine pistons.

For some time, engineering qualities of gray iron have not been exploited properly. This material no longer can be classified as the orphan of the cast metals. It can be produced with engineering qualities that can be specified and reproduced from casting to casting. In addition, castability is excellent.

Castability — Practical evaluation of cast metals cannot be based entirely on mechanical properties. You must consider other factors, such as castability, machinability and availability—qualities most difficult to evaluate. Quality of castability is perhaps the most difficult.

For example, shrinkage apparently is a function of the chemical composition that governs the difference in temperature between that at which solidification begins and ends. This is small for steel, large for gray iron. Gray iron does not contract on solidification. Steel has the highest shrinkage rate, gray iron the lowest. We require heavy shrink heads for steel and often none for gray iron. S.G. and malleable iron fall between these two.

Flowability—Another characteristic is flowability. This function is dependent on chemical analysis and pouring temperature. It controls, to a large extent, the economic section thickness that can be used. But foundrymen usually are reluctant to state what these minimum sections are because by proper gating they have been able to pour extremely thin sections in all the metals. These materials can be arranged in this order of least flowability: Cast steel, malleable iron, S. G. iron and gray iron.

Experience indicates they can be classified as to castability the same as flowability.

Machinability — In many cases cost of the casting is a minor item when compared to its total cost. Usually, this can be traced back to its machinability.

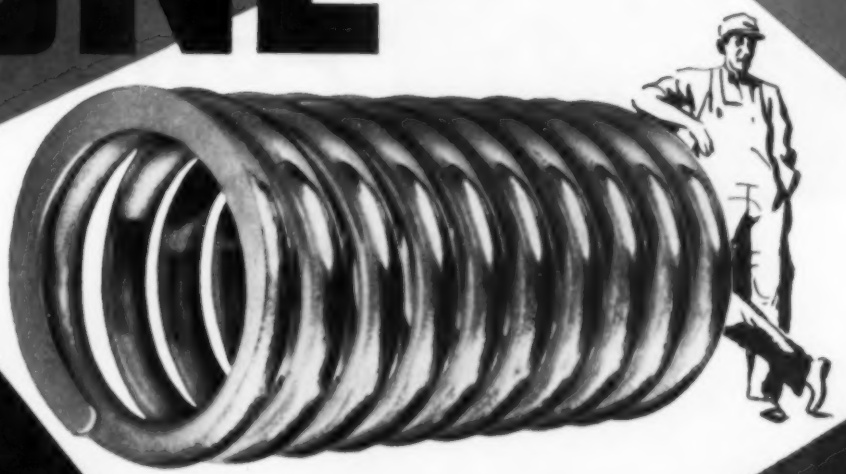
Briefly, tests show the most-easily machined materials are annealed S. G. and malleable iron, followed by Class 20 gray iron. As required tensile strength is increased, machinability of gray iron decreases, until at about 250 Brinell it becomes difficult to machine. Cast steel machinability also is dependent on hardness—the higher the hardness, the less machinable it becomes.

Then, given any particular hardness, the materials' microstructure will affect machinability. Use of alloys will at times increase machinability.

As a practical approach, any plant's production force can be counted on to have a sound idea as to machinability of the various cast materials. It's recommended that you acquaint yourself with it, since it can be a valuable yardstick on future design problems.

This is the third in a series of four articles on the cast ferrous metals by Mr. Egan. The first two covered specifications and physical properties, tensile strengths and modulus of elasticity. The last in the series will deal with some of the unfavorable points foundrymen usually don't talk about.

ONE



or a MILLION

Divisions of ASSOCIATED SPRING CORPORATION

WALLACE BARNES COMPANY
BRISTOL, CONNECTICUT

THE WILLIAM D. GIBSON COMPANY
1800 CLYBOURN AVE. CHICAGO 14,

RAYMOND Manufacturing COMPANY
CORRY, PENNSYLVANIA

BARNES-GIBSON-RAYMOND
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B-G-R COOK PLANT
ANN ARBOR MICHIGAN

10 PROVEN SOURCES COAST TO COAST

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BRISTOL CONNECTICUT

OHIO DIVISION
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DUNBAR BROTHERS COMPANY
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MILWAUKEE DIVISION
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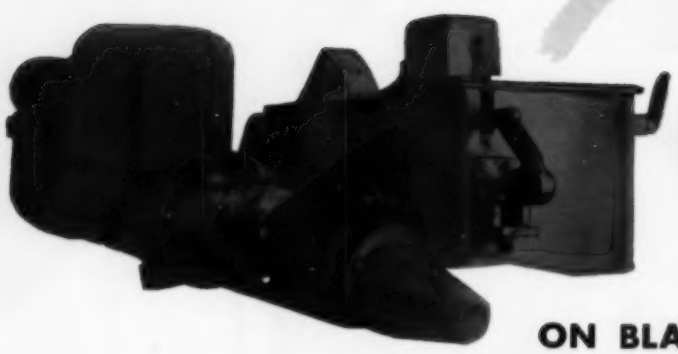
SEABOARD Coil Spring Div.
15001 S. BROADWAY GARDENA, CALIF.

IN CANADA - The WALLACE BARNES Co., Ltd., Hamilton, Ontario



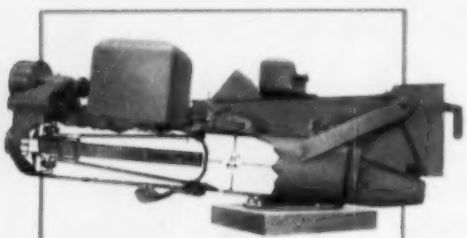
Controlled POWER

FOR PLUGGING
TAPPING HOLES

ON BLAST FURNACES
ON LARGE ELECTRIC FURNACES

Bailey CLAY GUNS

Long a standard of precision and safety on blast furnaces, Bailey Clay Guns now are used on large electric furnaces as well.



The plunger is driven by a highly efficient power screw and double reduction gear drive. Design is such that Bailey Clay Guns are operated by three separate motor drives.

These guns supply clay under high pressure exactly where it is needed to give best results and safety in quickly plugging tapping holes. Fast, accurate and solid positioning is assured by an exclusive pedestal support and lever mechanism. Since the electrically-driven piston develops a clay pressure of 600 psi, there is ample power to maintain long tapping holes.

WILLIAM M. Bailey COMPANY
ENGINEERS
LEADERSHIP THROUGH QUALITY

1221 BANKSVILLE ROAD — PITTSBURGH 16, PA

NEW PRODUCTS and equipment

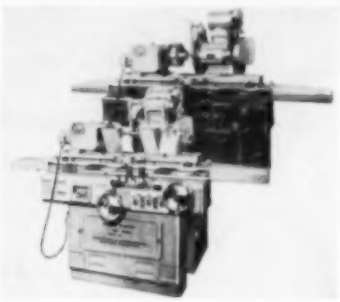
Reply card on page 91 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue.

Internal Grinder

. . . universal, cylindrical

No. 1230 was designed chiefly for plants doing a variety of external and internal grinding but not enough of each to require the purchase of specialized machines.

It is a rugged, precision tool,



capable of making rough cuts as well as producing fine finishes. Its controls are conveniently located and adjustments give it ease of handling. A cabinet base type, its work carrying table is mounted directly on fixed base ways, without an intervening cross traveling saddle. Gallmeyer & Livingston Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 1

Ultra-Speed Hobber

. . . with single spindle

The Model 1445 will machine spur and helical gears at selective variable speeds up to 570 rpm. It will handle up to eight pitch gears having diameters as large as 5 in. and face widths to 4 in. Climb or conventional hobbing can be used.

A universal spindle head design incorporates required feeds and adjustments for hobbing both types of gears. It has three separate adjustments: Hob thread angle; gear helix angle; and hob position shift. A hydraulic cross

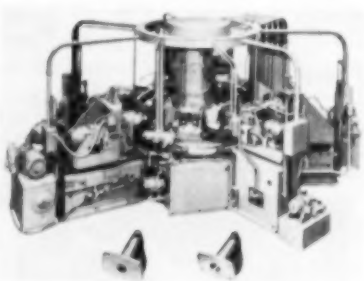
feed drives the hob across the work at the desired helix angle. Michigan Tool Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 2

Special Machine

. . . seven station

It takes rough castings and mills, core drills, drills, reams, chamfers and taps 288 master-



brake cylinders per hour (gross). The 10-way, 72-in. center-column machine is hydraulically fed. Equipment includes a 7-position automatic power - driven index table that is 72 in. in diameter. Shot bolt and table hold-down clamps are at rough and finish milling stations.

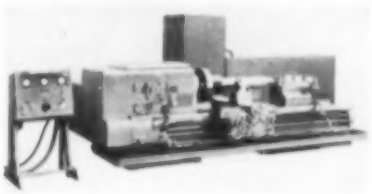
The table has chip paddles for automatic disposal of chips and an index mechanism which may be easily serviced and maintained. The electrically controlled automatic index is of the cam-and-roller type. Buhr Machine Tool Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 3

Engine Lathe

. . . 125 hp motor

A heavy duty 32 in. machine, it has a 125 hp, two-speed dc motor with variable speeds from 42 to 1400 rpm and 56 feeds from 0.002



to 0.250 ipr. Standard features include: A four-directional power rapid traverse built into the apron, a one-piece apron and hardened rack and a totally-enclosed quick-change box. Bed ways are hardened and ground steel, with a thrust-lock tailstock.

Tests by the company have shown 118 hp consumed at the cut. R. K. LeBlond Machine Tool Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 4

Release Agent

. . . for shell molding

Shallway Shell Curing Oil SC-10 is used for curing or breaking in patterns. Patterns are cleaned thoroughly, using a commercial cleaner. Oil is brushed into the pattern with an ordinary paint brush. It is then plugged into an

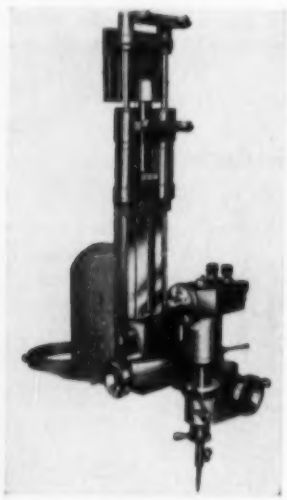
electrical outlet and heated to about 450° F for ½ hour. SR-20 Shallway Shell Release Emulsion is for routine continuous use in releasing shells during shell mold production. It may be diluted with about ten parts of water and sprayed. Shallway Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 5

Hydraulic Duplicators

. . . semiskilled can use

Attachable to current or old-model millers, lathes, shapers or grinders, this duplicator is designed for small tool shops. It is powered by a side-mounted motor



which delivers hydraulic pressure for automatic duplication of intricate master patterns or templates.

The tracer point is resistant to chattering and breakage. Through its contact with the template, it governs the machine's spindle — causing it to advance or retract according to the predetermined contour as the longitudinal feed progresses. It is accurate to 0.001 in. Automotive Service Tools Inc.

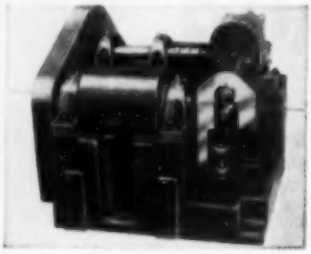
FOR MORE DATA CIRCLE REPLY CARD NO. 6

Wire Straightener

. . . automatic feed

This self-feeding bench model meets fine wire requirements in small shops. A choice of arbors mounted in ball bearings, each with five straightening dies, is offered: One for wire in the 0.020 to 0.040 in. range, the other in the 0.025 to 0.062 in. range. Power is a ½ horsepower high speed motor.

Units can be supplied to feed 30, 60 or 90 fpm. Included are



mounting lugs for bench installation and one set of cast iron dies along with sub screws, wrench, necessary guards and gear reducer. Mettler Machine Tool Inc.

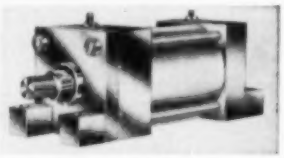
FOR MORE DATA CIRCLE REPLY CARD NO. 7

Cylinder Mounting

. . . for side, foot

Sturdy, thick, square mounting lugs mount flush with standard square heads and caps. Its listed advantages include: It occupies less space; mounting lugs are quickly installed and are detachable; centerline height is precision machined to a tolerance of 0.002 in.

Known as model 77, it is available in 1½ to 20 in. bores in 200 psi air cylinders; 1½ to 12 in. bores



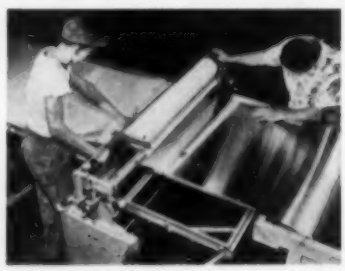
(inclusive) in 2000 psi hydraulic cylinders. Miller Fluid Power Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 8

Power Applicator

. . . for adhesive paper

Model 51-C-1-M applies pressure sensitive adhesive paper to pol-



ished surfaces of stainless steel, sheet plastic, aluminum, glass etc. Rubber roller pressure feeds the paper evenly and quickly.

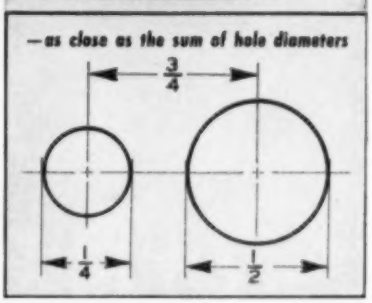
An adjustable conveyor platform takes the sheet fed from the rack, applies the paper, then delivers it to a container rack. Approximate speed of feed is thirty fpm. L. R. Wallace & Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 9

Gearless Drill Heads

. . . reduces center spacing

They can drill and tap spindles as close as the sum of the drill diameters. The new standards permit closer spacing of holes, virtual-



ly placing no limit on the number of holes that can be drilled at one pass.

A ½ and a ¼ in. drill can be placed at ¾ in. center. Zagar Tool Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 10

Milling Machine

. . . knee bearing on column

The Toolmaster comes in three styles: 1A, manual feed to quill; 1B, power feed to quill; 1C, heavy duty head. Standard ranges are 16 in. longitudinal, 10 in. across and 17 in. vertical. The overarm construction permits the operator to swivel and position it for complete coverage of the table with the spindle head. Bearings are square gibbed, saddle knee.

Instead of a wrap around bearing surface on the dovetail guide, the knee takes its bearing in the

two V surfaces formed between the dovetail guide and column

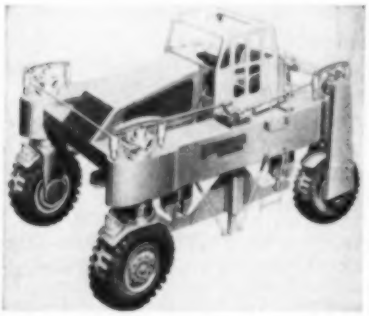
face. It is said to offer more resistance to deflection. Cincinnati Milling Machine Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 11

Material Carrier

. . . for handling steel

This 50,000 lb carrier comes in a swinging shoe model (SC-50) or a rigid shoe model (RS-50) in six



standard sizes. Reserve is termed adequate. They are available with twin-disc torque converter drive.

Specifications on the SC-50 and RC-50 may be obtained. Gerlinger Carrier Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 12

Skelp Drum

. . . for uninterrupted flow

This permanent magnet type (the Fretz Moon system) is said to exert twice the strength of electros. It controls skelp while it is in the loop, holding it to a predetermined pattern and preventing it from buckling and tangling.

It consists of a heavy steel shaft. Alnico V permanent magnetic castings are mounted on it. A ¼ in. non-magnetic manganese shell, mounted on ball bearings, is rotated on the shaft, while the shaft and magnetic castings remain stationary. Eriez Mfg. Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 13

Induction Heaters

. . . for heavy duty use

These high frequency vacuum tube induction heaters, Type EI-25C, have been engineered for heavy duty use. The entire cubicle is pressurized. The cabinet is

formed from heavy gage steel and fitted with full-length doors for walk-in accessibility to the rectifier and oscillator sections.

The completely self-contained electronic heater features automatic timing for each unit operation, which is manual or automatic, depending upon the production setup. Allis-Chalmers Mfg. Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 14

Quick Change Chucks

. . . concealed tension spring

Designed for vertical and horizontal drilling and tapping, the spring eliminates use of external snap rings that can snag the operator's hands.

Insertion or removal of collets is simple: The outside ring of the chuck is merely lifted. Spindle rpm need not be slowed. This action converts single spindle machines for multi-tool use at low cost. The collets are available for Titan Presto Chucks in OD sizes from 11/16 to 3¼ in. Titan Tool Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 15

Projection Welders

. . . three-phase spot

Both the SPT 2 and EPT 2 machines are available in 50, 75, 100 and 150 kva at 50 per cent Duty Cycle. The SPT 2 has from 18 to 48 in. throat depth, with an electrode force of 2260 to 4000 lb. The EPT 2 has 12 to 30 in. throat depth, with an electrode force of 3000 to 5000 lb.

The SPT 2 will make high quality welds on large production runs to commercial standards on a wide range of clean mild steel, stainless, aluminum and other light alloys. By varying weld time, weld current and electrode force, heavier gages can be joined at slower speeds. Sciaky Bros. Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 16

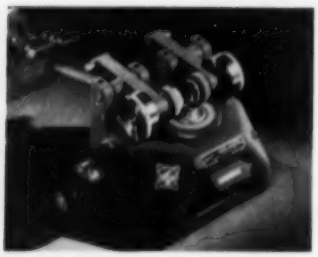
Abrasion Tester

. . . range of applications

Model 140 evaluates resistance to abrasion. It will test painted, lacquered and electroplated surfaces, plastic coated materials and textile fabrics. The rotary rub-wear action is the result of dual abrading wheels, one rubbing the specimen from the center outward, the other from the outside toward the center. Marks are two criss-crossing arcs, which cover an area

of about 30 sq cm.

Two sets of stainless steel weights (500 and 1000 grams)



and the abrading arm (250 grams) provide three standard ranges of wheel pressures. Taber Instrument Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 17

Disc Wheels

. . . resinoid bonded

The BZ wheels withstand heavy pressures and harsh dressing action under high power at recommended speeds.

They are said to be super strong for heavy duty grinding. Strength comes from the resinoid bond construction and multi-layer reinforcement of fibre glass, plus specially treated Nylon mesh. The discs are available in a range of grades allowing a choice of hardness. Bay State Abrasive Products Co.

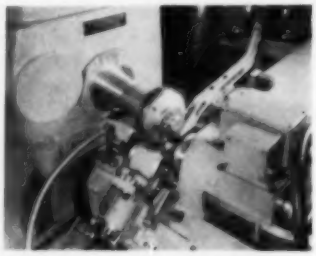
FOR MORE DATA CIRCLE REPLY CARD NO. 18

Shaving Machine

. . . automatic

The No. 8 full-tool gear shaver has two tools for chamfering and shaving. A rotary serrated tooth chamfering tool is on a movable slide below and at the left of the shaving tool. An air cylinder automatically advances and withdraws the chamfering tool slide in timed relation with the shaving cycle.

Tips of the teeth of automotive pinions are chamfered at the same



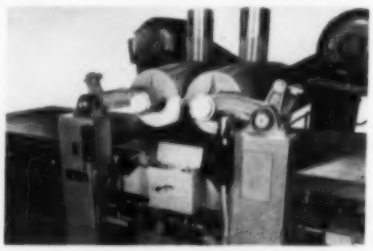
time the teeth are being shaved. Fellows Gear Shaper Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 19

Polishing Machines

. . . electro-hydraulic

The tandem roll horizontal machines feature a hydraulic device to automatically follow contours of shaped pieces. The roll permits rough cut or cut down and finishing at one work setup.



They handle extrusions of all types, sheets, plates, rods, tubing and odd-shaped items. Rolls are powered by motors, and the work or fixture table is available in any width or length. It may be oscillated crosswise. Central Machine Works.

FOR MORE DATA CIRCLE REPLY CARD NO. 20

Boring Head

. . . of quality steels

No. 820 was developed as a light and medium duty tool for precision boring, facing and threading operations. It is adaptable to a variety of applications using interchangeable shanks. The micrometer style adjusting collar has widely spaced graduations permitting rapid and accurate direct reading adjustments.

All surfaces are carefully machined for a precision fit. Maximum offset capacity with the standard slide bar is ¾ in. This can be increased to 1⅛ in. by using Cat. No. 810 slide-bar; to 2 in. with the Cat. No. 811 bar. All side bars accommodate ⅜ in. diameter tool shanks. Head length, less shank, is 1⅞ in. Mico Instrument Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 21

Tracing Paper, Cloth

. . . several extras

The six improved items being introduced are said to offer great-

er translucency, permanence, uniformity, penciling and erasability. Odorless and completely cured, they will not become brittle or lose transparency. Storage and the application of drafting tape cause only negligible leaching.

Whitney No. 378 is a dual-purpose (blue or white) cloth that accepts ink and pencil. Samples are available. Charles Bruning Co. Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 22

Storage System

. . . features accessibility

The Rak-A-Tier Pick-A-Case, with inclined runners adjustable

at both picking and feeding ends, is set on stringers. It provides for 30 case fronts on each 7 ft section. All feeding is done from the rear or the side opposite that of the picking front. When a case

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JOHNSON JB BEARINGS
Sleeve-Type

SLEEVE BEARING HEADQUARTERS SINCE 1901

NEW PRODUCTS and equipment

is removed from the picking side, another replaces it, fed by gravity.

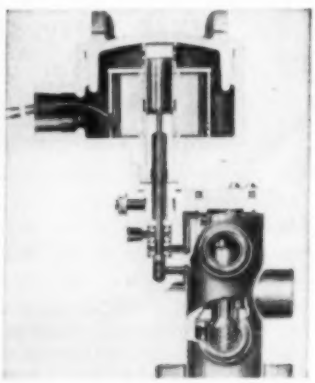
They are engineered so pallet rack stringers can be joined to the Pick-A-Case and adjusted to any level. The runner sections have a double set of stops to hold the load in position. Artco Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 23

Solenoid Air Valves

. . . explosion proof

They feature a short solenoid stroke which, in combination with pilot operation, eliminates coil burn out. Poppet design with



linear sealing contact on resilient seats makes both pilot and main valve self scavenging.

The cover of the explosion proof housing is removable for quick access to the solenoid. Coils are interchangeable for conversion to any standard voltage. Barksdale Valves.

FOR MORE DATA CIRCLE REPLY CARD NO. 24

Multi-Purpose Fastener

. . . one-piece head

The Tuff-Tite one piece metal washer head and assembled neoprene washer prevents leaks, protects surfaces and absorbs shock. When the fastener is seated, an undercut in the washer head traps and controls the flow of neoprene at the outside edge, forming a water and air tight seal. Patented conical design of the washer locks the neoprene in the threads and hole. Townsend Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 25

FREE LITERATURE

Catalogs and Clip Sheets

Use these reply cards to bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue.

Grinding

Carborundum Co.'s "V40 for Tool Room Grinding" covers its new line of tool room wheels and lists hints for conservation of tools. A chart makes recommendations for grinding high speed tool and die steels—4 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 26

Test Bars

American Smelting & Refining Co.'s Federated Metals Division discusses test bar theory and practice. Written from a foundryman's viewpoint, it is aimed at the copper and aluminum alloy casting field—Bulletin No. 168, 18 pages.

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Cam Clutches

Morse Chain Co. offers a general description on the Cam clutches, including cutaway views, operating functions, etc. Specs, installation procedures and lubrication information also are available — C11-54 A, 8 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 28

Stainless Castings

Cooper Alloy Foundry Co. offers its current issue of *Newscast* The publication deals with stainless steel castings, valves and fittings.

FOR A FREE COPY CIRCLE REPLY CARD NO. 29

Electric Starters

Electric Controller & Mfg. Co. describes a new line of Air-Break Electric Starters for 2200-5000 volt motors—Folder 1060.

FOR A FREE COPY CIRCLE REPLY CARD NO. 30

Test Equipment

American Research Corp. covers developments in and additions to its line of environmental test equipment—Catalog No. 55, 6 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 31

Tractor

LeTourneau - Westinghouse Co. describes the features of the 208 hp, rubber-tired Tournatractor—Form 54-005-T, 28 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 32

Precision Timing

M. Ducommun Co. has published information on timing instruments for industry, engineering and research—11 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 33

Lift Truck

Hyster Co.'s RC-150, 15,000-lb capacity lift truck is described. Action photos and specifications are included—Form 1287B, 16 pages.

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Plastic Pipe

American Hard Rubber Co. offers complete technical data on Dur-Ace, a corrosion - resistant plastic pipe — Bulletin 80-A, 6 pages.

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Bonding Aluminum

Arthur Tickle Engineering Works Inc. explains the Alumicoat process of bonding aluminum and its alloys to ferrous metals.

FOR A FREE COPY CIRCLE REPLY CARD NO. 36

Atomic Energy

Atomic Energy for Industry Inc. offers information on the uses of radioisotopes in industry—6 pages.

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Clutch

Dodge Mfg. Corp. covers its Air-Grip Clutch. Its advantages are outlined—Bulletin A-634, 4 pages.

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Wet Blasting

American Wheelabrator & Equipment Corp.'s "How To Cut Die and

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Mold Finishing Time 50 to 94%" shows how wet blasting is done in its LiquamatteR machines — 4 pages.

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Dielectric Heating

Allis-Chalmers Mfg. Co. details the operating advantages of its dielectric heaters — Bulletin 15B-6431B, 4 pages.

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Cylindrical Grinder

Landis Tool Co. describes its 4 in. Type H plain grinder for precision cylindrical grinding—Catalog A-54, 16 pages.

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Ductile Iron

International Nickel Co. Inc. offers case histories to show that ductile iron is comparable to gray iron. In some cases wear resistance is said to be better—Bulletin DI-20, 3 pages.

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Mechanical Tubing

A. B. Murray Co. Inc. describes its seamless mechanical tubing—from ⅛ to 12 in. OD. Sizes and quantities in stock are included—Vol. 7, No. 6, 19 pages.

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Ramming Mix

Basic Refractories Inc. discusses the new uses of the magnesia ramming mix. It is designed for original bottom construction and maintenance of open hearth and electric steel producing furnaces —4 pages.

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Recorder

Bailey Meter Co. explains its receiver recorder for pneumatic and electric transmission systems —Product Specifications E12-5, 12 pages.

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Thread Rolling Machine

Waterbury Farrel Foundry & Machine Co. shows and describes its automatic, inclined shell thread rolling machine—Circular No. 833-E1-2, 4 pages.

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Fluid Power

Oilgear Co. illustrates and describes its line of fluid power pumps, motors, transmissions, cylinders and valves—Bulletin 10051-D, 12 pages.

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Guide Pins, Bushings

Lamina Dies & Tools Inc. includes photos of items, detailed line drawings with dimensions and prices of its guide pin bushings and guide pins—12 pages.

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Carbide Tipped Tools

Cleveland Twist Drill Co. offers information on the use, care and recommended speeds and feeds for carbide tipped drills and reamers —24 pages.

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Red Lead Paints

The Lead Industries Association offers "Red Lead Paints for Galvanized Steel, Rusted, Weathered or Treated New"—Letter No. 9.

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EDITORIAL REPRINTS:

Texas Gulf Coast

On the Texas Gulf Coast rising population and booming oil, gas and chemical industries are creating big new demands for metal products. Here's a new frontier for metalworking (p. 46).

FOR A FREE COPY CIRCLE REPLY CARD NO. 51

Heat Treating

Carburizing, dry cyaniding, malleablizing, carbon restoration, gas pickling are processes in which controlled gas atmospheres are paying off. You'll find the details on p. 72.

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Smoke Control

Part II shows how precipitators serving a Pacific Coast open-hearth shop reduce dust emission, p. 76. A simple operation removes fumes arising at descaling machines at slabbing and blooming mills.

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Cast Ferrous Metals

Part III begins on p. 80. Performance limits dictate the metals use. You'll find an interpretation of procedures and data essential to getting the right metal on the job.

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STEEL
November 29, 1954

Market Outlook

THE UPTURN in the steel business means better business for everybody.

Every time the steel industry makes and sells a million tons of finished steel, some 5 million tons of freight must be hauled to and from the steel mills, Benjamin F. Fairless, chairman, United States Steel Corp., says. Any upturn in steel production results in an immediate increase in freight revenues for the railroads. This means more money for the railroaders. Some of this money will go for automobiles, refrigerators and washing machines. The butcher, the baker and (with Christmas so near) even the candlestick maker should get their share, too.

BIG HAUL— Consider that 7.8 million tons of finished steel consumed this year came from inventory, and you can see that if steel usage remains steady the mills will have to turn out 7.8 million more tons next year than they did this year. That means freight haulage to and from the steel mills would rise 40 million tons next year over this year.

This perhaps would encourage the railroads to come back into the market for materials. The railroads have been especially hard hit by the postwar transition in the economy, and they have cut down sharply on their purchases of rails, freight cars and other equipment.

CONTRAST— In contrast to this lethargy, Seaboard Air Line Railroad just ordered 20,000 tons of rails valued at $2.7 million from the Ensley, Ala., works of U. S. Steel Corp.'s Tennessee Coal & Iron Division. That tonnage is equal to a third of a month's rail output of the industry at the current rate of production.

HIGH POINT— The freight haulage that Mr. Fairless was talking about increased some more in the week ended Nov. 28. In that week, steel production went to another new high for this year—79.5 per cent of capacity. Previous high for the year was 79 per cent in the preceding week.

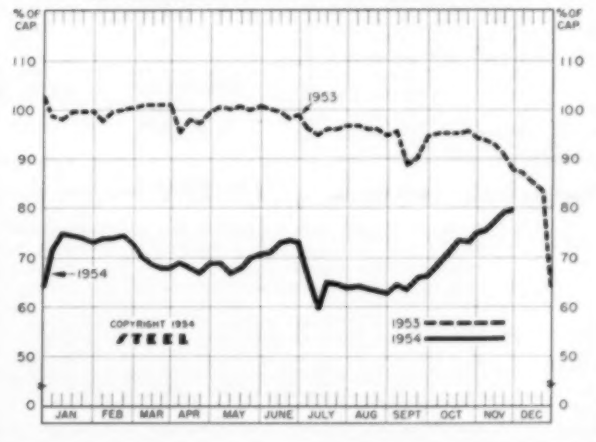
A 79.5 per cent rate is not far below the level which might be regarded as normal in an average peacetime year, Mr. Fairless believes.

MARGIN FOR SAFETY— To anyone who thinks the steel ingot production rate should be up around 100 per cent like it was early last year, Mr. Fairless wants to point out that steel plants were never intended or designed to operate at 100 per cent. "Historically, the industry has always sought to maintain a substantial reserve of capacity for use in times of great national emergency, and at such times it has been able to run at 100 per cent only by resorting to the uneconomic use of marginal facilities, materials and manpower," he explains.

FANNING OUT— The upturn in steel demand is spreading among products. At first, the revival was centered in cold-rolled sheets, but now it's noticed in steel bars. Chief emphasis is on carbon types, both hot-rolled and cold-finished. The pickup stems chiefly from the automotive industry.

PRICE TRENDS— Steel prices remain steady, keeping STEEL's arithmetical price composite on finished steel at $117.95 a net ton. Scrap prices weakened and lowered STEEL's composite on steelmaking grades to $33.08 a gross ton. It had been at $33.67 for the preceding three weeks.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Nov. 28	Change	Same Week 1953	Same Week 1952
Pittsburgh	77	+ 1*	77	103.5
Chicago	88	+ 2.5*	96.5	110.5
Mid-Atlantic	72	+ 1	90	101
Youngstown	83	+ 1	93	106
Wheeling	79.5	—12.5	78	100.5
Cleveland	86	— 2*	98	112.5
Buffalo	97.5	0	99.5	106.5
Birmingham	64	0	96.5	106.5
New England	58	0	85	93
Cincinnati	75.5	— 0.5	67.5	90
St. Louis	82	— 1.5	98	84
Detroit	80	0	97.5	105
Western	83	— 3	93	106
National Rate	79.5	+ 0.5	87.5	106

INGOT PRODUCTION‡

	Week Ended Nov. 28	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	117.7†	117.8	110.6	121.8
NET TONS (In thousands)	1,890	1,892	1,776	1,956

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,384,549 in 1954; 2,254,459 in 1953; 2,077,040 in 1952.

Metalworking Outlook—p. 27 Technical Outlook—p. 67

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Nov. 23 1954	Nov. 16 1954	Month Ago	Nov. Average
(1947-1949=100)	144.7	144.7	144.7	144.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 23

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.525
Rails, light, 40 lb	5.917
Tie Plates	5.275
Axles, railway	7.600
Wheels, freight car, 33 in. (per wheel)	48.500
Plates, carbon	4.675
Structural Shapes	4.517
Bars, tool steel, carbon (lb)	0.430
Bars, tool steel, alloy, oil hardening die (lb)	0.525
Bars, tool steel, H.R., alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.135
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4, V 1 (lb)	1.610
Bars, H.R., alloy	8.775
Bars, H.R., stainless, 303 (lb)	0.418
Bars, H.R., carbon	5.000
Bars, reinforcing	5.050
Bars, C.F., carbon	8.160
Bars, C.F., alloy	11.275
Bars, C.F., stainless, 302 (lb)	0.433
Sheets, H.R., carbon	4.880
Sheets, C.R., carbon	5.871
Sheets, galvanized	7.220
Sheets, C.R., stainless, 302 (lb)	0.548
Sheets, electrical	$9.350
Strip, C.R., carbon	7.507
Strip, C.R., stainless, 430 (lb)	0.415
Strip, H.R., carbon	5.125
Pipe, black, buttweld (100 ft)	15.000
Pipe, galv., buttweld (100 ft)	18.605
Pipe, line (100 ft)	146.804
Casing, oil well, carbon (100 ft)	154.216
Casing, oil well, alloy (100 ft)	227.875
Tubes, boiler (100 ft)	‡
Tubing, mechanical, carbon	‡
Tubing, mechanical, stainless, 304 (100 ft)	161.193
Tin plate, hot-dipped, 1.25 lb	8.533
Tin plate, electrolytic, 0.25 lb	7.233
Black plate, can making quality	6.333
Wire, drawn, carbon	7.938
Wire, drawn, stainless, 430 (lb)	0.545
Bale ties (bundle)	5.860
Nails, wire, 8d common	7.815
Wire, barbed (80-rod spool)	7.109
Woven wire fence (20-rod roll)	16.815

‡Not available.

STEEL's FINISHED STEEL PRICE INDEX*

	Nov. 24 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	194.53	194.53	194.53	189.38	152.52
Index in cents per lb.	5.270	5.270	5.270	5.130	4.132

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$117.95	$117.95	$117.95	$115.18	$91.64
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	56.54	46.10
Basic Pig Iron, GT	56.04	56.04	56.04	56.04	45.60
Malleable Pig Iron, GT	57.27	57.27	57.27	57.27	47.27
Steelmaking Scrap, GT	33.08	33.67	32.67	34.67	29.83

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Nov. 24 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.30	4.30	4.30	4.15	3.35
Bars, H.R., Chicago	4.30	4.30	4.30	4.15	3.35
Bars, H.R., deld. Philadelphia	4.55	4.55	4.55	5.302	3.83
Bars, C.F., Pittsburgh	5.40	5.40	5.40	5.20	3.95-4.00
Shapes, Std., Pittsburgh	4.25	4.25	4.25	4.10	3.25
Shapes, Std., Chicago	4.25	4.25	4.25	4.10	3.25
Shapes, deld. Philadelphia	4.53	4.53	4.53	4.38	3.50
Plates, Pittsburgh	4.225	4.225	4.225	4.10	3.40
Plates, Chicago	4.225	4.225	4.225	4.10	3.40
Plates, Coatesville, Pa.	4.225	4.225	4.225	4.35	3.50
Plates, Sparrows Point, Md.	4.225	4.225	4.225	4.10	3.40
Plates, Claymont, Del.	4.225	4.225	4.225	4.55	3.50
Sheets, H.R., Pittsburgh	4.05	4.05	4.05	3.925	3.25
Sheets, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Sheets, C.R., Pittsburgh	4.95	4.95	4.95	4.775	4.00
Sheets, C.R., Chicago	4.95	4.95	4.95	4.775	4.00
Sheets, C.R., Detroit	5.10	5.10	5.10	4.975	4.20
Sheets, Galv., Pittsburgh	5.45	5.45	5.45	5.275	4.40
Strip, H.R., Pitts.	4.05	4.05	4.05	4.025	3.25
Strip, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Strip, C.R., Pittsburgh	5.75	5.75	5.75	5.45-5.95	4.00
Strip, C.R., Chicago	6.00	6.00	6.00	5.70	4.00-4.15
Strip, C.R., Detroit	5.60-.90	5.60-.90	5.60-.90	5.45-6.05	4.20-.25
Wire, Basic, Pitts.	5.75	5.75	5.75	5.475-5.525	4.15
Nails, Wire, Pittsburgh	6.85	6.85	6.85	6.35-6.55	5.15
Tin plate (1.50 lb), box, Pitts.	$9.05	$9.05	$9.05	$8.95	$7.75

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$78.00	$78.00	$78.00	$75.50	$61.00
Wire rods, 5/16-9/16" Pitts.	4.675	4.675	4.675	4.525	3.40

PIG IRON, Gross Ton					
Bessemer, Pitts.	$57.00	$57.00	$57.00	$57.00	$47.00
Basic, Valley	56.00	56.00	56.00	56.00	46.00
Basic, deld. Phila.	59.66	59.66	59.66	60.75	49.44
No. 2 Fdry, Pitts.	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Valley	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, deld. Phila.	50.16	50.16	50.16	61.25	49.94
No. 2 Fdry, Birm.	52.88	52.88	52.88	52.88	39.38
No. 2 Fdry (Birm.) deld. Cin.	60.58	60.58	60.58	60.43	46.08
Malleable, Valley	56.50	56.50	56.50	56.50	46.50
Malleable, Chicago	56.50	56.50	56.50	56.50	46.50
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pitts.	$33.50	$34.50	$32.50	$35.50	$33.50
No. 1 Heavy Melt, E. Pa.	32.25	33.50	32.50	35.00	26.50
No. 1 Heavy Melt, Chicago	33.50	33.00	33.00	33.50	29.50
No. 1 Heavy Melt, Valley	34.50	34.50	35.50	34.50	32.75
No. 1 Heavy Melt, Cleve.	32.50	32.50	32.50	32.50	30.25
No. 1 Heavy Melt, Buffalo	31.50	32.50	30.50	34.50	29.75
Rails, Rerolling, Chicago	54.50	54.50	54.50	46.50	44.50
No. 1 Cast, Chicago	39.50	39.50	39.50	34.50	42.50

COKE, Net Ton					
Beehive, Furn, Connlsvl.	$13.75	$13.75	$13.75	$14.75	$13.25
Beehive Fdry, Connlsvl.	16.75	16.75	16.75	16.75	15.75
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.00

Daily Nonferrous Price Record

	Price Nov. 24	Last Change	Previous Price	Oct. Avg.	Sept. Avg.	Nov. 1953 Avg.
Copper	30.00	Apr. 13	29.75-30.00	30.000	30.000	25.606
Lead	14.80	Oct. 4	14.55	14.775	14.400	13.306
Zinc	11.50	Sept. 3	11.00	11.500	11.900	10.000
Tin	91.125	Nov. 23	90.875	93.110	93.545	81.096
Nickel	60.00	Jan. 14, 1953	56.50	60.000	60.000	60.000
Aluminum	22.20	Aug. 5, 1954	21.50	22.200	22.200	21.500
Magnesium	27.00	Mar. 9, 1953	24.50	27.000	27.000	27.000

Quotations in cents per pound based on: Copper, deld. Conn. Valley; Lead, common grade, deld. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, deld. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99+ %, deld.; Magnesium 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.** Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.** Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.** Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.** Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

Enthonics
AT WORK

Go from GRIME . . . to . . . SHINE . . . in SECONDS!

Use ENTHONE Emulsion Cleaner 75

DIP . . . . steel parts to be cleaned in Emulsion Cleaner 75 for only ***15 seconds.*** This simple immersion is done at room temperature (no heating facilities required) and with no irritation of the operator's nose, throat or skin.

RINSE . . in plain water.

DONE . . . and done ***thoroughly*** . . . in seconds! All heavy oil films and solid dirt have been removed from every corner and crevice . . . from slots, tapped holes and sculptured patterns.

INSURE . smooth, bright, adherent electrodeposits.

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ELECTROPLATING CHEMICALS

Service Representatives and Stock Points: BINGHAMTON, N. Y., Austin F. Fletcher, Inc.; CHICAGO, Ardco, Inc.; CLEVELAND, R. O. Hull & Co.; DALLAS, Weaver Engineering & Supply Co., Inc.; LOS ANGELES, L. H. Butcher Co.

Nonferrous Metals

Coming: Plan to adjust domestic industry to foreign competition. Puts government needs first. Domestic and foreign materials would fight it out in market place

Nonferrous Metal Prices, Pages 98 & 99

A PLAN to aid domestic industry adjust to competition from abroad is being tested for public reaction. If acceptable, further tariff reductions and freeing of trade restrictions would be possible.

Metals companies will be watching the development closely. They've seen plenty of competition from abroad in recent years. The policy shapes up roughly like this: After defense and stockpile needs are assured, domestic and foreign materials should fight it out in the market place. If U. S. firms can't compete without high tariffs or subsidy, they should be encouraged to get into another field where they can.

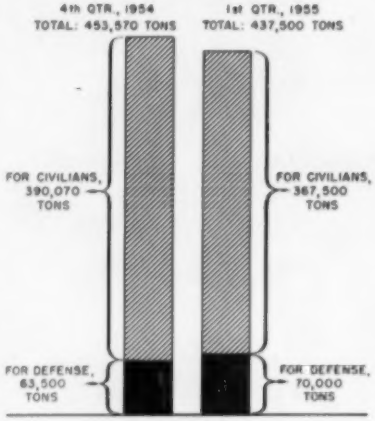
Reconsidered—The idea isn't a new one, and centers on the question of whether we might be stifling foreign supply at the risk of shutting off what will have to be a major source of future raw material needs.

The latest trial balloons resemble the proposals by the United Steelworkers' David J. McDonald to the Randall Commission, and the "Trade Adjustment" bill introduced in Congress by Sen. John Kennedy (Dem., Mass.). They called for federal help where communities, companies and workers were hurt by increases in imports caused by tariff changes. A subsidy with a purpose, the McDonald plan envisaged assistance (such as government contract opportunities, special loans and fast tax write-offs of new facilities) to realign production or shift to alternate products.

Sounding Board—The recent Foreign Trade Convention in New York was used to sound out opinion on the idea. Here's how it was explained by Samuel W. Anderson, assistant secretary of commerce for international affairs: "As the strong trend for greater industrialization continues in the U. S., our diminishing domestic resources of raw materials must be greatly supplemented by imports.

"We must be wise enough in this period of lessening reliance on home resources to be careful not to increase our real costs by insisting upon exploiting relatively high cost resources in comparison with cheaper available foreign resources, unless reasons for so doing are absolutely compelling. All economic history supports the fact that our high standard of living might be damaged by a rise in real costs of raw materials not adequately offset by increased productivity in manufacture," Mr. Anderson pointed out, adding that damage to workers in the industries affected can always be pinpointed without difficulty. He believes the government can assist companies and individuals unable to help themselves to readjust their affairs because of tariff action in the national interest.

U. S. Aluminum Supply—Where It's Going



Proponents of the plan find in it a way to put the Randall report recommendations to work. They argue that high tariffs, direct and indirect government subsidies won't work. Opposition to such a broad program won't be hard to find either. The "high labor cost" and "infant industry" arguments will be heard.

Stockpile Progress

Stockpile objectives have been attained in 30 of the 75 strategic materials programmed by the government. Only 18 materials are less than halfway toward their established goals, says the Senate-House committee on defense production in its fourth annual report on the state of industrial mobilization since Korea.

The committee reports more than $155 billion in appropriations for procurement and construction since Korea, of which $6.8 billion is in strategic materials. Deliveries of $92.9 billion have been made through fiscal 1954, and $21.7 billion more is expected in fiscal 1955. Most materials scarce last year are in good supply, notes the committee. Nickel, tantalum, selenium, titanium and mica are still scarce.

Metal Price Indexes Rise

Nonferrous prices edged up sharply in October, compared to recent months, in the Bureau of Labor Statistics price index. The nonferrous group as a whole rose to 127.4 per cent of the 1947-1949 average, compared to 126.2 per cent in September; primary metal refinery shapes gained 0.7 point to 114.2; scrap zoomed 5.5 points to 135.9; secondary metal and alloy shapes gained 3.1 points to 118.6; mill shapes added only 0.1 point to 136.4; and wire and cable moved up 0.6 point to 122.5.

Conservation Continues

Metal conservation programs during the metal shortage days are haunting salesmen today. Research then on how to use less metal in products paid off and is being continued in many companies. Bell Telephone Laboratories' experience in saving antimony, copper, lead, nickel and tin is enough to make metal men shudder. Bell expects to make wider use of magnetic oxides, titanates, silicon, germanium and other compositions as circuit elements in place of systems employing more cumbersome components and circuity. "The result of this may be a marked reduction in the volume of materials used, also savings in many of the more 'critical' materials," says Bell.

Long-distance transmission 50 years ago required 350 lb of copper per mile of voice circuit compared to 1 lb in the new carrier systems of today and radio relay systems that need no transmission wire, says Bell's Dr. R. M. Burns. Replacement of antimonial lead with polyethylene and extruded aluminum is foreseen in the Bell system. Research turned up the fact that 0.06 per cent calcium could be substituted as the hardening agent to produce storage batteries. In telephone service they last more than twice as long and have but a fifth of the power loss, as compared with antimonial lead batteries. Saving of 200,000 lb of antimony yearly is a result.

Here's Enduro Stainless Steel Quality for only 9% more cost

That's the experience of the Guardian Locker Division of The Flxible Company, Millersburg, Ohio. They're making and selling public rental lockers. They use ENDURO Stainless Steel for all exterior sections, and for interior bottom sections —at the place where wear is heaviest. They're making coin receivers and lock parts of ENDURO, too.

Cost is only 9% more than it would be for the same locker made of plain carbon steel, painted. Revenue increases from the stainless steel lockers are reported to range from 15% to 40%.

Women particularly are attracted by the bright, clean-looking ENDURO finish. It has a psychological "sell". And, ENDURO naturally is easier to maintain. Easy to keep clean and bright looking. ENDURO will not tarnish. It resists abrasion and denting. It has no applied surface to chip, peel, or wear away. It lasts long. It is easy to fabricate.

Here's more proof that ENDURO brightwork sells. That it appeals to everyone. It can do the same for your products. Republic metallurgists will help you apply ENDURO's "bonus benefits" to step up interest and sales power . . . efficiently and economically. Just write:

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REPUBLIC ENDURO STAINLESS STEEL

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 22.20, pigs 20.50 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 24; No. 43, 5% Si, 23.8; No. 142, 4% Cu, 25.1; No. 195, 4.5% Cu, 0.8% Si, 24.5; No. 214, 3.8% Mg, 25.2; No. 356, 7% Si, 0.3% Mg, 23.9.

Antimony: R.M.M. brand, 99.5% 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.; Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 30.00 deld. Conn. Valley, 30.00 deld. Midwest; Lake 30.00 deld.; Fire refined 29.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $145-$150 per troy oz.

Lead: Common 14.80, chemical 14.90, corroding 14.90, St. Louis; N. Y. basis, add 0.20.

Lithium: 98%, $11-$14 per lb, depending on quantity.

Magnesium: 99.8%, self-palletizing pig 27.00; notched ingot 27.75, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., and Madison, Ill., add 1.20 for pig and 1.25 for ingot. Sticks 1.3 in. diameter, 46.00, 100 to 4999 lb f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more f.o.b. Freeport, Tex., or Madison, Ill. Add 1.20 for Port Newark, N. J

Mercury: Open market, spot, New York, $315-$320, per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3.40 per lb; pressed ingot $4.00 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked 60.00; 25-lb pigs 62.65; "XX" nickel shot 63.65; "P" nickel shot or ingots for addition to cast iron, 60.00; prices f.o.b. Port Colborne, Ont., including import duty, New York basis, add 0.92.

Osmium: $140-$150 per troy oz nom.

Palladium: $21 per troy oz.

Platinum: $84-$87 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $125 per troy oz.

Ruthenium: $75-$80 per troy oz.

Selenium: 99.5%, $5-$6 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $39.00 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot 91.125, prompt 91.00.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max) $4.72; grade A-2 (0.5% Fe max) $4.46 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000 lb lots $4.95 per lb nom., f.o.b. shipping point; less than 1000 lb $5.10 nom.; 99+% hydrogen reduced, $4.65. Treated ingots $6.70.

Zinc: Prime Western 11.50, brass special 11.75, intermediate 12.00, E. St. Louis, freight allowed over 0.50 per pound. High grade 12.85, special high grade 13.00, die casting alloy ingot 15.50, deld.

Zirconium: Sponge $10 per lb; powder electronics grade $15, flash grade $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloy 21.25-21.75; No. 12 foundry alloy (No. 2 grade) 20.25-20.75; 5% silicon alloy, 0.60 Cu max., 23.75-24.00; 13 alloy 0.60 Cu max., 23.75-24.00; 195 alloy 21.75-22.75; 108 alloy 20.75-21.25; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 21.50-22.00; grade 2, 20.50-21.00; grade 3, 19.50-20.00; grade 4, 18.50-19.00.

Brass Ingot: Red brass, No. 115, 29.50; tin bronze No. 225, 41.00; No. 245, 34.75; high-leaded tin bronze, No. 305, 34.00; No. 1 yellow, No. 405, 25.25; manganese bronze No. 421, 27.75

Magnesium Alloy Ingot: AZ63A, 31.50; AZ91B, 26.00; AZ91C, 31.50; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy.) Strip, $1.68; rod, bar, wire, $1.65.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb, 36.28; 30,000 lb. 36.53; l.c.l. 37.03. Magnet wire deld., 15,000 lb or more 41.83; l.c.l 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more $20.00 per cwt; pipe, full coils $20.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $11; forging billets $9; hot-rolled and forged bars, $9.

ZINC

(Prices per lb c.l., f.o.b. mill) Sheets 23.00, ribbon zinc in coils, 18.50-20.50; plates 18.00-22.25.

ZIRCONIUM

Plate $27; H.R. strip $28; C.R. strip $35; forged or H.R. bars $27; wire, 0.015 in., 1 cent per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	86.5	67.5	92.5
Strip, C.R.	92.5	70.5	98.5
Plate, H.R.	84.5	66.5	90.5
Rod, Shapes	82.5	65.5	88.5
Seamless Tubes	115.5	100.5	137.5
Shot, Blocks		60.0	

ALUMINUM*

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	62.5	61.0	...	...
0.156-0.172	52.9	51.3	...	...
0.188	52.9	51.3	...	65.8
0.219-0.234	50.1	48.5	...	...
0.250-0.281	50.1	48.5	...	62.7
0.313	50.1	48.5	...	59.8
Cold-finished				
0.375-0.547	48.9	46.5	58.8	56.2
0.563-0.688	48.9	46.5	55.9	52.7
0.750-1.000	47.7	45.3	51.1	49.6
1.063	47.7	45.3	...	47.9
1.125-1.500	45.9	43.6	49.4	47.9
Rolled				
1.563	44.7	42.4	...	...
1.625-2.000	44.1	41.8	...	46.2
2.125-2.500	43.0	40.7	...	...
2.563-3.375	41.7	39.5	...	...

ALUMINUM*

Sheets and Circles: 1100 and 3003 mill finish c.l. (30,000 lb base; freight allowed over 400 lb)

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	12-49	34.9	...	...
0.135-0.096	12-48	35.4	...	...
0.095-0.077	12-48	36.1	33.6	38.6
0.076-0.061	12-48	36.7	33.8	38.8
0.060-0.048	12-48	37.2	34.1	39.2
0.047-0.036	12-48	37.7	34.6	39.6
0.037-0.030	12-48	38.1	35.0	40.3
0.029-0.024	12-48	38.7	35.8	40.8
0.023-0.019	12-36	39.4	36.1	41.6
0.018-0.017	12-36	40.2	36.7	42.6
0.016-0.015	12-36	41.1	37.5	43.7
0.014	12-24	42.1	38.5	45.0
0.013-0.012	12-24	43.3	39.2	46.0
0.011	12-24	44.2	40.4	47.6
0.010-0.0095	12-24	45.5	41.5	49.2
0.009-0.0085	12-24	46.8	43.0	51.2
0.008-0.0075	12-24	48.4	44.2	53.1
0.007	12-18	49.9	45.7	55.4
0.006	12-18	51.6	47.1	90.4

*72-180 in. lengths. †26 in. max. dia.

ALUMINUM*

Plates and Circles: Thickness 0.250-3.0 in. 24-60 in. width or dia, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	34.7	38.9
5050-F	34.7	38.9
5004-F	35.7	40.0
5052-F	37.4	42.4
6061-T6	38.6	43.0
2024-T4*	40.8	46.9
7075-T6*	48.6	55.2

*24-48 in. widths or dia., 72-180 in. lengths.

ALUMINUM*

Forging Stock: Round, Class 1, 46.8-36.3, in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 52.6-40 in. random lengths 0.375-4.0 in. thick, widths 0.750-10.0 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
¼	$515.70	2	$ 48.30
1	24.75	4	132.90
1¼	23.50	6	238.35
1½	40.05	8	356.60

*Alloy designations are standard for use on and after Oct. 1, 1954. To relate them to designations used prior to that time, see STEEL, Aug. 9, 1954, p. 95.

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 60.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot rolled AZ31, 53.00, 20,000 lb or more 0.250-in. and over widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in. 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 28 clippings 14.50; low copper clippings 14.50; mixed clippings 12.50; old sheet 11.00; borings and turnings 7.50; pistons and struts 8.00; crankcases 11.00; industrial castings 11.00.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.38b	45.86c	....	48.44	26.000	26.000	25.250
Yellow Brass	41.72	34.50d	42.26	44.63	19.750	19.500	18.000
Red Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	22.250
Low Brass, 80%	44.47	44.41	45.01	47.28	22.125	21.875	21.375
Naval Brass	45.76	40.07	52.80	48.92	18.250	18.000	17.500
Commercial Bronze, 90%	46.95	46.89	47.49	49.51	23.875	23.625	23.125
Nickel Silver, 10%	55.36	50.43g	57.69	....	23.625	23.375	11.813
Phosphor Bronze, A, 5%	66.58	67.06	67.06	68.22	26.125	25.875	24.875
Silicon Bronze	52.71	51.90	52.75	70.11e	25.125	24.875	24.125
Manganese Bronze	49.48	43.62	54.06	....	18.250	18.000	17.500
Muntz Metal	43.96	39.77	....	....	18.625	18.375	17.875

a. Cents per lb f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Copper and Brass: Heavy copper and wire No. 1 26.50-27.00; No. 2 copper 25.00-25.50; light copper 23.00-23.50; No. 1 composition red brass 21.00; No. 1 composition turnings 20.50; mixed brass turnings 14.00; new brass clippings 18.00; No. 1 brass rod turnings 15.00; light brass 12.50; heavy yellow brass 15.50; new brass rod ends 16.00; auto radiators, unsweated 17.00; cocks and faucets 17.00; brass pipe 17.50.

Lead: Heavy 11.75-12.00; battery plate 6.25-6.50; linotype and stereotype 13.75-14.00; electrotype 12.00-12.50; mixed babbitt 12.50-13.00.

Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 16.50-17.50.

Monel: Clippings 23.00-25.00; old sheet 21.00-23.00; turnings 16.00-18.00; rods 23.00-25.00.

Nickel: Sheets and clips 60.00-65.00; rolled anodes 60.00-65.00; turnings 40.00; rod ends 60.00-65.00.

Tin: No. 1 pewter 55.00-60.00; block tin pipe 75.00-80.00; No. 1 babbitt 50.00.

Zinc: Old zinc, 5.00-5.25; new die cast scrap, 4.75-5.00; old die cast scrap, 3.25-3.50.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 2S, 3S clippings 15.75-16.00; 51S, 52S clippings 15.75-16.00; 14S, 17S, 24S clippings 15.00-15.25; mixed clippings 14.50-14.75; old sheet 13.75-14.00; old cast 13.75-14.00; clean old cable, free of steel 15.75-16.00; borings and turnings 14.00-14.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper, Brass: No. 1 copper 29.00; No. 2 copper 27.50; light copper 26.00; refinery brass (60% copper) per dry copper content 25.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 28.75; No. 2 copper 27.25; light copper 25.75; No. 1 composition borings 23.25; No. 1 composition solids 23.50; heavy yellow brass solids 18.00-18.25; yellow brass turnings 17.00-17.25; radiators 19.00.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.70 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 5000-10,000 lb; electrodeposited 39.78, cast 42.04, 2000-5000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.05; 200-499 lb $1.09; 500-999 lb $1.085; 1000 lb or more $1.08.

Zinc: Bar 20.00, bar or flat top 19.00 ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.

Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb 70.6; 100-600 lb 56.3; 700-1900 lb 53.9; 2000-9900 lb 52.1; 10,000 lb or more 51.

Stannous Chloride (Anhydrous): Less than 50 lb $1.564; 50 lb $1.224; 100-300 lb $1.07+; 400-900 lb $1.049; 100-1900 lb $1.025; 2000-4900 lb 98.8; 5000-19,000 lb 92.7; 20,000 lb and over 86.6.

Stannous Sulphate: Less than 5 lb $1.264; 50 lb 96.4; 100-1900 lb 94.4; 2000 lb and over 92.4.

Zinc Cyanide: Under 1000 lb 54.30; 1000 lb and over 52.30.

UNION WIRE ROPE CORPORATION

ACHIEVES

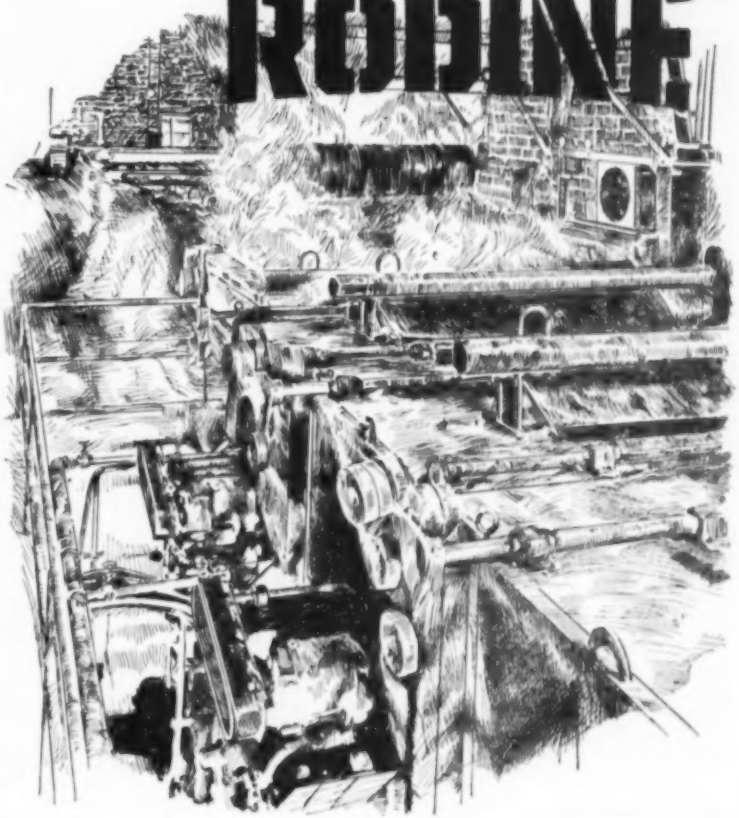
SMOOTH OPERATION—
IMPORTANT ECONOMIES

IN THE

PICKLING ROOM

WITH

RODINE®



Rod and wire are pickled clean with "Rodine" without wasting either acid or metal. Breakage in drawing from acid brittleness is minimized.

It is cheaper to pickle with "Rodine" than without it.

Pioneering Research and Development Since 1914

AMERICAN CHEMICAL PAINT COMPANY

AMBLER, PA.

DETROIT, MICH. NILES, CALIF. WINDSOR, ONT.

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; Key on page 101. Key to footnotes, page 103.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$61.50

INGOTS, Alloy (NT)

Detroit R7 .....$65.00
Houston S5 .....73.00
Midland,Pa. C18 .....65.00
Munhall,Pa. U5 .....65.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ....$64.00
Bessemer,Pa. U5 .....64.00
Buffalo R2 .....64.00
Clairton,Pa. U5 .....64.00
Ensley,Ala. T2 .....64.00
Fairfield,Ala. T2 .....64.00
Fontana,Calif. K1 ....72.00
Gary,Ind. U5 .....64.00
Johnstown,Pa. B2 .....64.00
Lackawanna,N.Y. B2 ..64.00
Munhall,Pa. U5 .....64.00
So.Chicago,Ill. R2,U5 ..64.00
So.Duquesne,Pa. U5 ...64.00
Youngstown R2 .....64.00

Carbon, Forging (NT)

Aliquippa,Pa. J5 .....$78.00
Bessemer,Pa. U5 .....78.00
Buffalo R2 .....78.00
Canton,O. R2 .....80.00
Clairton,Pa. U5 .....78.00
Conshohocken,Pa. A3 ..83.00
Ensley,Ala. T2 .....78.00
Fairfield,Ala. T2 .....78.00
Fontana,Calif. K1 ....86.00
Gary,Ind. U5 .....78.00
Geneva,Utah C11 ....78.00
Houston S5 .....85.00
Johnstown,Pa. B2 ....78.00
Lackawanna,N.Y. B2 ..78.00
LosAngeles B3 .....87.50
Munhall,Pa. U5 .....78.00
Seattle B3 .....91.50
So.Chicago R2,U5,W14 .78.00
So.Duquesne,Pa. U5 ...78.00
So.SanFrancisco B3 ...87.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 .....$86.00
Buffalo R2 .....86.00
Canton,O. R2, T7 ....86.00
Conshohocken,Pa. A3 ..93.00
Detroit R7 .....86.00
Fontana,Calif. K1 ....105.00
Gary,Ind. U5 .....86.00
Houston S5 .....93.00
Ind.Harbor,Ind. Y1 ...86.00
Johnstown,Pa. B2 ....86.00
Lackawanna,N.Y. B2 ..86.00
LosAngeles B3 .....106.00
Massillon,O. R2 .....86.00
Midland,Pa. C18 .....86.00
Munhall,Pa. U5 .....86.00
So.Chicago, R2,U5,W14.86.00
So.Duquesne,Pa. U5 ...86.00
Struthers,O. Y1 .....86.00
Warren,O. C17 .....86.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$96.50
Canton,O. R2 .....96.50
Cleveland R2 .....96.50
Gary,Ind. U5 .....96.50
So.Chicago R2, W14 ..96.50
So.Duquesne,Pa. U5 ...96.50

SKELP

Aliquippa,Pa. J5 .....4.00
Fontana,Calif. K1 .....4.775
Munhall,Pa. U5 .....3.90
Warren,O. R2 .....3.90
Youngstown R2, U5 ....3.90

WIRE RODS

AlabamaCity,Ala. R2 ..4.675
Aliquippa,Pa. J5 .....4.675
Alton,Ill. L1 .....4.85
Buffalo B11, W12 ....4.675
Cleveland A7 .....4.675
Donora,Pa. A7 .....4.675
Fairfield,Ala. T2 .....4.675
Fontana,Calif. K1 ....5.475
Houston S5 .....5.075
IndianaHarbor,Ind. Y1 .4.675
Johnstown,Pa. B2 ....4.675
Joliet,Ill. A7 .....4.675
KansasCity,Mo. S5 ....5.015
Kokomo,Ind. C16 .....4.775
LosAngeles B3 .....5.475
Minnequa,Colo. C10 ...4.925
Monessen,Pa. P7 .....4.675
No.Tonawanda,N.Y. B11 4.675
Pittsburg,Calif. C11 ..5.325
Portsmouth P12 .....4.675
Roebling,N.J. R5 .....4.775
So.Chicago,Ill. R2 ....4.675
Sterling,Ill.(1) N15 ....4.675
Sterling,Ill. N15 .....4.775
Struthers,O. Y1 .....4.675
SparrowsPoint,Md. B2..4.775
Torrance,Calif. C11 ...5.475
Worcester,Mass. A7 ...4.975

STRUCTURALS

Carbon Steel Stand. Shapes

Ala.City,Ala. R2 .....4.25
Aliquippa,Pa. J5 .....4.25
Bessemer,Ala. T2 .....4.25
Bethlehem,Pa. B2 .....4.30
Birmingham C15 .....4.25
Clairton,Pa. U5 .....4.25
Fairfield,Ala. T2 .....4.25
Fontana,Calif. K1 .....4.90
Gary,Ind. U5 .....4.25
Geneva,Utah C11 .....4.25
Houston S5 .....4.65
Ind.Harbor,Ind I-2 ....4.25
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 ....4.85
Lackawanna,N.Y. B2...4.30
LosAngeles B3 .....4.95
Minnequa,Colo. C10 ....4.70
Munhall,Pa. U5 .....4.25
Niles,Calif. P1 .....4.80
Phoenixville,Pa. P4 ....3.95
Portland,Oreg. O4 .....5.00
Seattle B3 .....5.00
So.Chicago U5, W14 ....4.25
So.SanFrancisco B3 ....4.90
Torrance,Calif. C11 ....4.95
Weirton,W.Va. W6 .....4.25

Wide Flange

Bethlehem,Pa. B2 .....4.30
Clairton,Pa. U5 .....4.25
Fontana,Calif. K1 .....5.25
Lackawanna,N.Y. B2 ...4.30
Munhall,Pa. U5 .....4.25
Phoenixville,Pa. P4 ....3.95
So.Chicago,Ill. U5 ....4.25

Alloy Stand. Shapes

Clairton,Pa. U5 .....5.20
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.20
Houston S5 .....5.60
Munhall,Pa. U5 .....5.20
So.Chicago,Ill. U5 .....5.20

H.S., L.A. Stand. Shapes

Aliquippa,Pa. J5 .....6.40
Bessemer,Ala. T2 .....6.40
Bethlehem,Pa. B2 ....6.45
Clairton,Pa. U5 .....6.40
Fairfield,Ala. T2 .....6.40
Fontana,Calif. K1 ....7.05
Gary,Ind. U5 .....6.40
Geneva,Utah C11 .....6.40
Houston S5 .....6.80
Ind.Harbor,Ind. I-2, Y1.6.40
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. S5 ....7.00
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 .....7.10
Munhall,Pa. U5 .....6.40
Seattle B3 .....7.15
So.Chicago,Ill. U5, W14.6.40
So.SanFrancisco B3 ....7.05
Struthers,O. Y1 .....6.40

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ..6.45
Munhall,Pa. U5 .....6.40
So.Chicago,Ill. U5 .....6.40

PILING

BEARING PILES

Munhall,Pa. U5 .....4.25
So.Chicago,Ill. U5 .....4.25

STEEL SHEET PILING

Ind.Harbor,Ind. I-2....5.075
Lackawanna,N.Y. B2 ..5.075
Munhall,Pa. U5 .....5.075
So.Chicago,Ill. U5 ....5.075

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.225
Aliquippa,Pa. J5 .....4.225
Ashland,Ky.(15) A10 ..4.225
Bessemer,Ala. T2 .....4.225
Buffalo R2 .....4.225
Clairton,Pa. U5 .....4.225
Claymont,Del. C22 ....4.225
Cleveland J5, R2 .....4.225
Coatesville,Pa. L7 .....4.225
Conshohocken,Pa. A3 ..4.225
Ecorse,Mich G5 .....4.375
Fairfield,Ala. T2 .....4.225
Fontana,Calif.(30) K1..4.875
Gary,Ind. U5 .....4.225
Geneva,Utah C11 .....4.225
GraniteCity,Ill. G4 ....4.425
Harrisburg,Pa. C5 ....3.975
Houston S5 .....4.625
Ind.Harbor,Ind. I-2, Y1.4.225
Johnstown,Pa. B2 .....4.225
Lackawanna,N.Y. B2 ..4.225
LoneStar,Tex. L6 .....4.55
Mansfield,O. E6 .....4.225
Minnequa,Colo. C10 ...5.075
Munhall,Pa. U5 .....4.225
Newport,Ky. N9 .....4.225
Pittsburgh J5 .....4.225
Riverdale,Ill. A1 .....4.225
Seattle B3 .....5.125
Sharon,Pa. S3 .....4.225
So.Chicago,Ill. R2 ....4.225
So.Chicago,Ill. U5,W14 .4.225
SparrowsPoint,Md. B2..4.225
Steubenville,O. W10 ...4.225
Warren,O. R2 .....4.225
Weirton,W.Va. W6 ....4.225
Youngstown R2,U5,Y1 4.225

PLATES, Carbon Abras. Resist.

Fontana,Calif. K1 ....6.025
Geneva,Utah C11 .....5.375

PLATES, Wrought Iron

Economy,Pa. B14 .....9.80

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland J5, R2 .....6.45
Conshohocken,Pa. A3 ..6.45
Ecorse,Mich. G5 .....6.60
Fairfield,Ala. T2 .....6.45
Fontana,Calif.(30) K1 ..7.15
Gary,Ind. U5 .....6.45
Geneva,Utah C11 .....6.45
Houston S5 .....6.85
Ind.Harbor,Ind. I-2, Y1.6.45
Johnstown,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ...6.45
LosAngeles B3 .....7.35
Munhall,Pa. U5 .....6.45
Pittsburgh J5 .....6.45
Seattle B3 .....7.35
Sharon,Pa. S3 .....6.45
So.Chicago,Ill. U5, W14.6.45
SparrowsPoint,Md. B2 ..6.45
Youngstown U5, Y1 ....6.45

PLATES, Alloy

Claymont,Del. C22 ....5.80
Coatesville,Pa. L7 .....5.80
Fontana,Calif.K1 .....6.45
Gary,Ind. U5 .....5.80
Houston S5 .....6.20
Johnstown,Pa. B2 .....5.80
Munhall,Pa. U5 .....5.80
Newport,Ky. N9 .....5.80
Seattle B3 .....6.70
Sharon,Pa. S3 .....5.80
So.Chicago,Ill. U5, W14.5.80
SparrowsPoint,Md. B2 ..5.80

FLOOR PLATES

Cleveland J5 .....5.275
Conshohocken,Pa. A3 ..5.275
Harrisburg,Pa. C5 ....5.15
Ind.Harbor,Ind. I-2 ...5.275
Munhall,Pa. U5 .....5.275
So.Chicago,Ill. U5 ....5.275

PLATES, Ingot Iron

Ashland c.l. (15) A10..4.475
Ashland l.c.l. (15) A10.4.975
Cleveland c.l. R2 ....4.825
Warren,O. c.l. R2 .....4.825

BARS

BARS, Hot-Rolled Carbon

Ala.City,Ala. R2 .....4.30
Aliquippa,Pa. J5 .....4.30
Alton,Ill. L1 .....4.50
Atlanta,Ga. A11 .....4.50
Bessemer,Ala. T2 .....4.30
Birmingham C15 .....4.30
Buffalo R2 .....4.30
Canton,O. R2 .....4.40
Clairton,Pa. U5 .....4.30
Cleveland R2 .....4.30
Ecorse,Mich. G5 .....4.45
Emeryville,Calif. J7 ....5.05
Fairfield,Ala. T2 .....4.30
Fairless,Pa. U5 .....4.45
Fontana,Calif. K1 .....5.00
Gary,Ind. U5 .....4.30
Houston S5 .....4.70
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 .....5.00
Massillon,O. R2 .....4.40
Milton,Pa. M18 .....4.30
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....4.85
N.Tonawanda,N.Y. B11.4.30
Pittsburg,Calif. C11 ...5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
Seattle B3, N14, P22....5.05
So.Chicago, R2,U5,W14 4.30
So.Duquesne,Pa. U5 ....4.30
So.SanFran.,Calif. B3 ..5.05
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Warren,O. R2 .....4.30
Weirton,W.Va. W6 ....4.30
Youngstown R2, U5 ....4.30

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ....5.075
Buffalo R2 .....5.075
Canton,O. R2, T7 ....5.075
Clairton,Pa. U5 .....5.075
Detroit R7 .....5.075
Ecorse,Mich. G5 .....5.225
Fontana,Calif. K1 .....6.125
Fairless,Pa. U5 .....5.225
Gary,Ind. U5 .....5.075
Houston S5 .....5.475
Ind.Harbor,Ind. I-2, Y1.5.075
Johnstown,Pa. B2 ....5.075
KansasCity,Mo. S5 ....5.675
Lackawanna,N.Y. B2..5.075
LosAngeles B3 .....6.125
Massillon,O. R2 .....5.075
Midland,Pa. C18 .....5.075
So.Chicago R2, U5, W14 5.075
So.Duquesne,Pa. U5 ...5.075
Struthers,O. Y1 .....5.075
Warren,O. C17 .....5.075
Youngstown U5 .....5.075

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland R2 .....6.45
Ecorse,Mich. G5 .....6.60
Fairfield,Ala. T2 .....6.45
Fontana,Calif. K1 .....7.70
Gary,Ind. U5 .....6.45
Houston S5 .....6.85
Ind.Harb.,Ind. I-2, Y1..6.45
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. S5 ....7.05
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 .....7.15
Pittsburgh J5 .....6.45
Seattle B3 .....7.20
So.Chicago W14 .....6.45
So.Duquesne,Pa. U5 ...6.45
So.SanFrancisco B3 ....7.20
Struthers,O. Y1 .....6.45
Warren,O. R2 .....6.45
Youngstown U5 .....6.45

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2 .....4.45

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....4.30
Atlanta A11 .....4.50
Fontana,Calif. K1 .....5.00
Niles,Calif. P1 .....4.85
Portland,Oreg. O4 .....5.05
SanFrancisco S7 .....4.70

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 .....5.20
Gary,Ind. U5 .....5.20
Houston S5 .....5.60
KansasCity S5 .....5.80
Youngstown U5 .....5.20

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12,R2 5.40
Buffalo B5 .....5.45
Camden,N.J. P13 .....5.85
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7, C20 ....5.40
Detroit R7 .....5.40
Detroit B5, P17 .....5.60
Donora,Pa. A7 .....5.40
Elyria,O. W8 .....5.40
FranklinPark,Ill. N5 ...5.40
Gary,Ind. R2 .....5.40
GreenBay,Wis. F7 .....5.40
Hammond,Ind. L2, M13 .5.40
Hartford,Conn. R2 ....5.90
Harvey,Ill. B5 .....5.40
LosAngeles R2, S30 ...6.85
Mansfield,Mass. B5 ....5.95
Massillon,O. R2, R8 ....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.85
NewCastle,Pa.(17) B4 ..5.40
Pittsburgh J5 .....5.40
Plymouth,Mich. P5 .....5.65
Putnam,Conn. W18 .....5.95
Readville,Mass. C14 ....5.95
St.Louis,Mo. M5 .....5.70
So.Chicago,Ill. W14 ....5.40
SpringCity,Pa. K3 .....5.85
Struthers,O. Y1 .....5.40
Waukegan,Ill. A7 .....5.40
Worcester,Mass. W19 ...5.85
Youngstown F3, Y1 ....5.40

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19.4.65

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....6.625
BeaverFalls,Pa. M12,R2 6.625
Bethlehem,Pa. B2 .....6.625
Buffalo B5 .....6.625
Camden,N.J. P13 .....6.80
Canton,O. T7 .....6.625
Carnegie,Pa. C12 .....6.625
Chicago W18 .....6.625
Cleveland A7, C20 ....6.625
Detroit R7 .....6.625
Detroit B5, P17 .....6.825
Donora,Pa. A7 .....6.625
Elyria,O. W8 .....6.625
Gary,Ind. R2 .....6.625
GreenBay,Wis. F7 .....6.625
Hammond,Ind. L2, M13 6.625
Hartford,Conn. R2 ....6.925
Harvey,Ill. B5 .....6.625
LosAngeles S30 .....8.30
Mansfield,Mass. B5 ...6.925
Massillon,O. R2, R8 ...6.625
Midland,Pa. C18 .....6.625
Monaca, Pa. S17 .....6.625
Newark,N.J. W18 .....6.80
Plymouth,Mich. P5 .....6.825
So.Chicago W14 .....6.625
SpringCity,Pa. K3 .....6.80
Struthers,O. Y1 .....6.625
Warren,O. C17 .....6.625
Waukegan,Ill. A7 .....6.625
Worcester,Mass. A7 ....6.925
Youngstown F3, Y1 ....6.625

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....4.30
Atlanta A11 .....4.50
Birmingham C15 .....4.30
Buffalo R2 .....4.30
Cleveland R2 .....4.30
Emeryville,Calif. J7 ....5.05
Fairfield,Ala. T2 .....4.30
Fairless,Pa. U5 .....4.45
Fontana,Calif. K1 .....5.00
Ft.Worth,Tex.(42) T4 ..4.90
Gary,Ind. U5 .....4.30
Houston S5 .....4.70

Ind.Harbor, Ind. I-2, Y1 4.30
Johnstown,Pa. B2 ....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ...4.30
LosAngeles B3 .....5.60
Milton,Pa. M18 .....4.30
Minnequa,Colo C10 ....4.75
Niles,Calif. P1 .....4.85
Pittsburg,Calif. C11 ...5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 ....5.05
SandSprings,Okla. S5 ..5.15
Seattle B3, N14, P23..5.05
So.Chicago R2 .....4.30
So.Duquesne,Pa. U5 ...4.30
So.SanFrancisco B3 ...5.05
SparrowsPoint,Md. B2 ..4.30
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Youngstown R2, U5 ....4.30

BARS, Reinforcing
(Fabricated; to consumers)

Johnstown,Pa., ¼-1" B2..5.70
KansasCity S5 .....6.50
LosAngeles B3 .....5.95
Marion,O. P11 .....5.55
Pittsburgh U5 .....5.72
Seattle B3, N14, P23 ..6.15
So.SanFrancisco B3 ...6.00
SparrowsPt. ¼-1" B2...5.70
Williamsport,Pa. S19 ..5.60

RAIL STEEL BARS

Avis,Pa.(3) J8 .....4.25
ChicagoHts.(3) C2, I-2..4.20
ChicagoHts.(4) C2, I-2..4.30
Ft.Worth,Tex.(26) T4 ..4.75
Franklin,Pa. (3) F5 ..4.20
Franklin,Pa. (4) F5 ..4.30
Marion,O.(3) P11 .....4.15
Moline,Ill.(3) R2 .....4.30
Tonawanda(3) B12 ....4.15
Tonawanda(4) B12 ....4.30
Williamsport,Pa.(3) S19.4.30

BARS, Wrought Iron

Economy,Pa.(S.R.) B14 10.85
Economy,Pa.(D.R.) B14 13.50
Economy(Staybolt) B14 13.80
McK.Rks.(S.R.) L5 ..10.85
McK.Rks.(D.R.) L5 ..14.75
McK.Rks.(Staybolt) L5 16.25

SHEETS

SHEETS, Hot-Rolled Steel
(18 gage and heavier)

Ala.City,Ala. R2 .....4.05
Allenport,Pa. P7 .....4.00
Ashland,Ky.(8) A10 ...4.05
Cleveland J5, R2 .....4.05
Conshohocken,Pa. A3 ..4.10
Detroit(8) M1 .....4.20
Ecorse,Mich. G5 .....4.20
Fairfield,Ala. T2 .....4.05
Fairless,Pa. U5 .....4.10
Fontana,Calif. K1 ....4.825
Gary,Ind. U5 .....4.05
Geneva,Utah C11 .....4.15
GraniteCity,Ill. G4 ....4.25
Houston S5 .....4.45
Ind.Harbor,Ind. I-2, Y1.4.05
Irvin,Pa. U5 .....4.05
Kokomo,Ind. C16 .....4.15
Lackawanna,N.Y. B2 ..4.05
Mansfield,O. E6 (37) ...4.05
Mansfield,O. E6 (38) ...4.80
Munhall,Pa. U5 .....4.05
Newport,Ky. N9 .....4.05
Niles,O. N12 .....4.05
Pittsburg,Calif. C11 ....4.75
Pittsburgh J5 .....4.05
Portsmouth,O. P12 .....4.05
Riverdale,Ill. A1 .....4.05
Sharon,Pa. S3 .....4.05
So.Chicago,Ill. W14 .....4.05
SparrowsPoint,Md. B2 ..4.05
Steubenville,O. W10 ....4.05
Warren,O. R2 .....4.05
Weirton,W.Va. W6 ....4.05
Youngstown U5, Y1 ....4.05

SHEETS, H.R. (19 ga. lighter)

Ala.City,Ala. R2 .....5.35
Kokomo,Ind. C16 .....5.20
Niles,O. N12 .....4.95

SHEETS, H.R. (14 ga. heavier)
High-Strength Low-Alloy

Cleveland J5, R2 .....6.10
Conshohocken,Pa. A3 ..6.15
Ecorse,Mich. G5 .....6.25
Fairfield,Ala. T2 .....6.10
Fairless,Pa. U5 .....6.15
Fontana,Calif. K1 ....6.875
Gary,Ind. U5 .....6.10
Ind.Harbor,Ind. I-2, Y1.6.10
Irvin,Pa. U5 .....6.10
Lackawanna(35) B2 ....6.10
Munhall,Pa. U5 .....6.10
Pittsburgh J5 .....6.10
Sharon,Pa. S3 .....6.10
So.Chicago,Ill. U5 .....6.10
SparrowsPoint(36) B2 ..6.10
Warren,O. R2 .....6.10
Weirton,W.Va. W6 ....6.10
Youngstown U5, Y1 ....6.10

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ....4.30
Cleveland R2 .....4.65
Ind.Harbor,Ind. I-2 ....4.30
Warren,O. R2 .....4.65

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 .....4.95
Cleveland J5, R2 .....4.95
Conshohocken,Pa. A3....5.00
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....4.95
Fairless,Pa. U5 .....5.00
Follansbee,W.Va. F4 ...4.95
Fontana,Calif. K1 .....6.05
Gary,Ind. U5 .....4.95
GraniteCity,Ill. G4 ....5.15
Ind.Harbor,Ind. I-2, Y1.4.95
Irvin,Pa. U5 .....4.95
Lackawanna,N.Y. B2 ..4.95
Middletown,O. A10 ....4.95
Pittsburg,Calif. C11 ....5.90
Pittsburgh J5 .....4.95
Portsmouth,O. P12 .....4.95
SparrowsPoint,Md. B2 ..4.95
Steubenville,O. W10 ....4.95
Warren,O. R2 .....4.95
Weirton,W.Va. W6 ....4.95
Youngstown Y1 .....4.95

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 .....7.50
Ecorse,Mich. G5 .....7.65
Fairless,Pa. U5 .....7.55
Fontana,Calif. K1 .....8.55
Gary,Ind. U5 .....7.50
IndianaHarbor,Ind. Y1..7.50
Irvin,Pa. U5 .....7.50
Lackawanna(37) B2 ...7.50
Pittsburgh J5 .....7.50
SparrowsPoint(38) B2 ..7.50
Warren,O. R2 .....7.50
Weirton,W.Va. W6 ....7.50
Youngstown Y1 .....7.50

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....5.55
Middletown,O. A10 .....5.45
Warren,O. R2 .....5.55

SHEETS, Culvert (16 Ga.)	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.50	....
Canton,O. R2	5.70	6.15
Fairfield T2	5.70	....
Gary,Ind. U5	5.70	5.95
Ind.Harbor I-2	6.25	6.50
Irvin,Pa. U5	5.70	....
Kokomo,Ind. C16	6.35	....
MartinsFry.,O. W10	6.25	....
Newport,Ky. N9	6.25	6.50
Pitts.,Calif. C11	6.45	....
SparrowsPt. B2	5.70	....

SHEETS, Culvert	Pure Iron
Ashland,Ky. A10	6.75
MartinsFerry,O. W10	6.50
Gary,Ind. U5	5.95

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City,Ala. R2 .....5.45‡
Ashland,Ky. A10 .....5.45*
Butler,Pa. A10 .....5.45†
Canton,O. R2 .....5.45‡
Dover,O. R1 .....5.45‡
Fairfield,Ala. T2 .....5.45*
Gary,Ind. U5 .....5.45*
GraniteCity,Ill. G4 ....5.65‡
Ind.Harbor,Ind. I-2 ...5.45†
Irvin,Pa. U5 .....5.45†
Kokomo,Ind. C16 ....5.55‡
MartinsFerry,O. W10 ..5.45*
Middletown,O. A10 ....5.45†
Newport,Ky. N9 .....5.45†
Niles,O. N12 .....5.45‡
Pittsburg,Calif. C11 ..6.20‡
SparrowsPt.,Md. B2 ..5.45‡
Steubenville,O. W10 ..5.45‡
Weirton,W.Va. W6 ....5.45*

*Continuous and noncontinuous †Continuous. ‡Noncontinuous.

SHEETS, Galvanized
High-Strength Low-Alloy

Irvin,Pa. U5 .....8.20
SparrowsPoint(39) B2 ..8.20

SHEETS, Galvannealed Steel

Canton,O. R2 .....5.55
Irvin,Pa. U5 .....5.55
Kokomo,Ind. C16 .....5.95†
Newport,Ky. N9 .....6.00
Niles,O. N12 .....6.00

SHEETS, Galvanized Ingot Iron

Ashland,Ky.(8) A10 ....5.70
Canton,O. R2 .....6.20

SHEETS, Galvanized
Ingot Iron
(Hot-dipped continuous)

Ashland,Ky. A10 .....5.70
Butler,Pa. A10 .....5.70
Middletown,O. A10 ....5.70

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.30
Niles,O.(28) R2 .....6.30
Weirton,W.Va. W6 ....6.175

SHEETS, Aluminum Coated

Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ...5.375
Cleveland R2 .....5.375
Gary,Ind. U5 .....5.375
GraniteCity,Ill. G4 ....5.575
Ind.Harbor,Ind. I-2 ..5.375
Irvin,Pa. U5 .....5.375
Middletown,O. A10 ....5.375
Niles,O. N12 .....5.375
Youngstown Y1 .....5.375

BLUED STOCK, 29 ga.

Follansbee,W.Va. F4 ..7.375
Follansbee(23) F4 .....6.60
Yorkville,O. W10 .....7.375

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 5.85
Gary,Ind. U5 .....5.85
Mansfield,O. E6 .....5.85
Middletown,O. A10 ....5.85
Niles,O. N12 .....5.85
Weirton,W.Va. W6 ....5.85

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.25

SHEETS, Well Casing

Fontana,Calif. K1 ....6.325

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div. Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C31 Chester Blast Furnace Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J8 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng. HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P23 Pacific Steel Rolling

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless WeldedProducts
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.

T2 Tenn. Coal & Iron Div.
T3 Tenn.Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan.San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W.Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.05
Allenport,Pa. P7	4.05
Alton,Ill. L1	4.225
Ashland,Ky.(8) A10	4.05
Atlanta A11	4.25
Bessemer,Ala. T2	4.05
Birmingham C15	4.05
Bridgeport,Conn.(10)S15	4.05
Buffalo(27) R2	4.05
Conshohocken,Pa. A3	4.10
Detroit M1	4.20
Ecorse,Mich. G5	4.20
Fairfield,Ala. T2	4.05
Fontana,Calif. K1	4.825
Gary,Ind. U5	4.05
Houston,Tex. S5	4.45
Ind.Harbor,Ind. I-2, Y1	4.05
Johnstown,Pa.(25) B2	4.05
KansasCity,Mo.(9) S5	4.65
Lackaw'na,N.Y.(25) B2	4.05
LosAngeles(25) B3	4.80
Milton,Pa. M18	4.05
Minnequa,Colo. C10	5.15
NewBritain(10) S15	4.05
N.Tonawanda,N.Y. B11	4.05
Pittsburg,Calif. C11	4.80
Portsmouth,O. P12	4.05
Riverdale,Ill. A1	4.05
SanFrancisco S7	5.00
Seattle(25) B3, P23	5.05
Seattle N14	5.05
Sharon,Pa. S3	4.05
So.Chicago,Ill. W14	4.05
So.SanFrancisco(25) B3	4.80
SparrowsPoint,Md. B2	4.05
Sterling(1) N15	4.05
Sterling,Ill. N15	4.15
Torrance,Calif. C11	4.80
Warren,O. R2	4.05
Weirton,W.Va. W6	4.05
Youngstown U5	4.05

STRIP, Hot-Rolled Alloy

Bridgeport,Conn.(10)S15	6.45
Carnegie,Pa. S18	6.70
Fontana,Calif. K1	8.10
Gary,Ind. U5	6.70
Houston,Tex. S5	7.10
KansasCity,Mo. S5	7.30
LosAngeles B3	7.90
NewBritn.,Conn.(10)S15	6.45
Newport,Ky. N9	6.70
Seattle P23	7.80
Sharon,Pa. S3	6.70
So.Chicago W14	6.70
Youngstown U5	6.70

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.15
Conshohocken,Pa. A3	6.15
Ecorse,Mich. G5	6.30
Fairfield,Ala. T2	6.15
Fontana,Calif. K1	7.25
Gary,Ind. U5	6.15
Houston S5	6.55
Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.75
Lackawanna,N.Y. B2	6.15
LosAngeles(25) B3	6.90
Seattle(25) B3, P23	7.15
Sharon,Pa. S3	6.15
So.SanFrancisco(25) B3	6.90
SparrowsPoint,Md. B2	6.15
Warren,O. R2	6.15
Weirton,W.Va. W6	6.15
Youngstown U5, Y1	6.15

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.30
Warren,O. R2	4.65

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	5.75
Baltimore T6	5.75
Bridgeport,Conn.(10)S15	5.75
Cleveland A7, J5	5.75
Conshohocken,Pa. A3	5.80
Dearborn,Mich. D3	5.90
Detroit D2, M1, P20	5.90
Dover,O. G6	5.75
Ecorse,Mich. G5	5.90
Follansbee,W.Va. F4	5.75
Fontana,Calif. K1	7.65
FranklinPark,Ill. T6	5.55
Ind.Harbor,Ind. I-2	5.85
Indianapolis C8	5.90
Lackawanna,N.Y. B2	5.75
LosAngeles C1	7.80
Mattapan,Mass. T6	6.30
Middletown,O. A10	5.75
NewBedford,Mass. R10	6.20
NewBritain(10) S15	5.75
NewCastle,Pa. B4, E5	5.75
NewHaven,Conn. A7	6.50
NewHaven,Conn. D2	6.20
Pawtucket,R.I. R3	6.40
Pawtucket,R.I. N8	6.30
Pittsburgh J5	5.75
Portsmouth,O. P12	5.75
Riverdale,Ill. A1	5.85
Rome,N.Y.(32) R8	5.75
Sharon,Pa. S3	5.75
SparrowsPt.,Md. B2	5.75
Trenton,N.J.(31) R5	7.30
Wallingford,Conn. W2	6.20
Warren,O. B9, R2, T5	5.75
Weirton,W.Va. W6	5.75
Worcester,Mass. A7	6.60
Youngstown C8, Y1	5.75

STRIP, Cold-Rolled Alloy

Carnegie,Pa. S18	12.45
Cleveland A7	12.45
Dover,O. G6	12.45
Fontana,Calif. K1	14.55
FranklinPark,Ill. T6	12.45
Harrison,N.J. C18	12.45
Mattapan,Mass. T6	12.80
Pawtucket,R.I. N8	12.80
Sharon,Pa. S3	12.45
Worcester,Mass. A7	12.75
Youngstown C8	12.90

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7, J5	8.60
Dearborn,Mich. D3	8.75

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	8.75	8.35	9.30	11.45	14.15
Bridgeport,Conn.(10) S15	8.75	8.05	9.00	11.15	13.85
Bristol,Conn. W1	...	...	9.30	11.45	...
Carnegie,Pa. S18	...	8.05	9.00	11.15	13.85
Cleveland A7	8.75	8.05	9.00	11.15	13.85
Cleveland C7	...	8.05	9.00	11.15	13.85
Dearborn,Mich. D3	8.90	8.25	9.20	...	...
Detroit D2	8.90	8.25	9.20	10.95	...
Dover,O. G6	8.85	8.05	9.00	11.15	13.85
FranklinPark,Ill. T6	8.85	8.05	9.00	11.15	13.85
Harrison,N.J. C18	...	...	9.30	11.45	14.15
Indianapolis C8	8.00	8.20	9.00	11.15	13.85
Mattapan,Mass. T6	8.30	8.35	9.30	11.45	14.15
NewBritn.,Conn.(10) S15	8.75	8.05	9.00	11.15	13.85
NewCastle,Pa. B4	8.75	8.05	9.00	11.15	...
NewCastle,Pa. E5	8.75	8.05	9.00	11.15	13.85
NewHaven,Conn. D2	8.20	8.35	9.30	11.25	...
NewYork W3	...	8.35	9.30	11.45	14.15
Pawtucket,R.I. N8	8.30	8.35	9.30	11.45	14.15
Riverdale,Ill.(1) A1	8.85	8.05	9.00	11.15	13.85
Rome,N.Y.(32) R8	8.75	8.05	9.00	10.95	13.25
Sharon,Pa. S3	8.75	8.05	9.00	11.15	13.85
Trenton,N.J. R5	...	8.35	9.30	11.45	14.15
Wallingford,Conn. W2	8.20	8.35	9.30	11.45	14.15
Warren,O. T5	8.75	8.05	9.00	11.15	13.85
Weirton,W.Va. W6	8.75	8.05	9.00	11.15	13.85
Worcester,Mass. A7, T6	8.60	8.35	9.30	11.45	14.15
Youngstown C8	8.85	8.05	9.00	11.15	13.85
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	12.90	15.60	...
Buffalo W12	...	...	12.90	...	...
Harrison,N.J. C18	...	...	12.90	15.60	19.00
NewYork W3	...	...	12.90	15.60	19.00
Trenton,N.J. R5	...	...	12.90	15.60	19.00
Worcester,Mass. T6	...	...	12.90	15.60	19.00
Worcester,Mass. W12	...	...	12.90	...	...
Youngstown C8	...	...	13.25	15.95	19.35

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	6.35

STRIP, Electrogalvanized

Dover,O. G6	5.75*
Riverdale,Ill. A1	5.85*
Youngstown C8	5.75*
Warren,O. B9	5.75*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.15
Warren,O. B9	6.15

TIGHT COOPERAGE HOOP

Atlanta A11	4.775
Riverdale,Ill. A1	4.625
Sharon,Pa. S3	4.475
Youngstown U5	4.475

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	9.10	10.10	11.00
Brackenridge,Pa. A4	....	....	9.10	10.10	11.00
IndianaHarbor,Ind. I-2	8.025	8.50	9.10	10.10	...
Mansfield,O. E6	8.025	8.50	9.10	10.10	11.00
Newport,Ky. N9	8.025	8.50	9.10	10.10	11.00
Niles,O. N12	8.025	8.50	9.10	10.10	...
Vandergrift,Pa. U5	....	8.50	9.10	10.10	11.00
Warren,O. R2	8.025	8.50	9.10	10.10	11.00
Zanesville,O. A10	....	8.50	9.10	10.10	11.00

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	....	9.85	10.85	11.75
GraniteCity,Ill. G4	8.425*	8.95*	9.55*	10.55*	....
IndianaHarbor,Ind. I-2	8.225	8.75*	9.35*	....	....
Vandergrift,Pa. U5	....	9.25†	9.85†	10.85†	11.75†
Vandergrift,Pa. U5	8.225*	8.75*	9.35*	10.35*	11.25*
Warren,O. R2	8.225†	9.25	9.85	10.85	11.75
Zanesville,O. A10	....	9.25	9.85	10.85	11.75

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.95	12.50	13.00	14.00
Brackenridge,Pa. A4	11.95	....	....	....
Newport,Ky. N9	11.95	....	....	....
Vandergrift,Pa. U5	11.95	12.50	13.00	14.00
Zanesville,O. A10	11.95‡	12.50‡	13.00‡	14.00‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.00	16.60	17.10	....
Butler,Pa. A10	....	....	16.60	17.10	....
Vandergrift,Pa. U5	14.00	15.00	16.60	17.10	12.70
Warren,O. R2	....	....	....	....	12.70‡

* Semiprocessed. † Fully processed only. ‡ Coils annealed; semiprocessed ½c lower. § Coils. ¾-cent higher.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.50	$7.75	$8.15
Fairfield,Ala. T2	7.60	7.85	8.25
Fairless,Pa. U5	7.60	7.85	8.25
Gary,Ind. U5	7.50	7.75	8.15
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.50	7.75	8.15
Irvin,Pa. U5	7.50	7.75	8.15
Niles,O. R2	7.50	7.75	8.15
Pittsburg,Calif. C11	8.25	8.50	8.90
SparrowsPoint,Md. B2	7.60	7.85	8.25
Weirton,W.Va. W6	7.50	7.75	8.15
Yorkville,O. W10	7.50	7.75	8.15

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.175	....	....
Niles,O. R2	6.175	6.375	6.875

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.80	$9.05
Fairfield,Ala. T2	8.90	9.15
Fairless,Pa. U5	8.90	9.15
Gary,Ind. U5	8.80	9.05
Ind.Har. I-2, Y1	8.80	9.05
Irvin,Pa. U5	8.80	9.05
Pitts.,Cal. C11	9.55	9.80
Sp.Pt.,Md. B2	8.90	9.15
Warren,O. R2	8.80	9.05
Weirton,W.Va. W6	8.80	9.05
Yorkville,O. W10	8.80	9.05

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.60
Fairfield,Ala. T2	6.70
Fairless,Pa. U5	6.70
Gary,Ind. U5	6.60
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.60
Irvin,Pa. U5	6.60
Niles,O. R2	6.60
Pittsburg,Calif. C11	7.35
SparrowsPoint,Md. B2	6.70
Warren,O. R2	6.60
Weirton,W.Va. W6	6.60
Yorkville,O. W10	6.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	6.20
Gary,Ind. U5	6.20
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.20
Irvin,Pa. U5	6.20
Yorkville,O. W10	6.20

MANUFACTURING TERNES (Special Coated; Base Box)

Gary,Ind. U5	$7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$8.75

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.85

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	5.75
Aliquippa,Pa. J5	5.75
Alton,Ill. L1	5.925
Atlanta A11	5.93
Bartonville,Ill. K4	5.85
Buffalo W12	5.75
Chicago W13	5.75
Cleveland A7, C20	5.75
Crawfordsville,Ind. M8	5.85
Donora,Pa. A7	5.75
Duluth,Minn. A7	5.75
Fairfield,Ala. T2	5.75
Fostoria,O.(24) S1	5.95
Houston S5	6.15
Jacksonville,Fla. M8	6.27
Johnstown,Pa. B2	5.75
Joliet,Ill. A7	5.75
KansasCity,Mo. S5	6.35
Kokomo,Ind. C16	5.85
LosAngeles B3	6.70
Minnequa,Colo. C10	6.00
Monessen,Pa. P7	5.75
Newark 6-8 ga. I-1	6.40
No.Tonawanda B11	5.75
Palmer,Mass. W12	6.05
Pittsburg,Calif. C11	6.70
Portsmouth,O. P12	5.75
Rankin,Pa. A7	5.75
So.Chicago,Ill. R2	5.75
So.SanFrancisco C10	6.70
SparrowsPoint,Md. B2	5.85
Sterling,Ill.(1) N15	5.75
Sterling,Ill. N15	5.85
Struthers,O. Y1	5.75
Waukegan,Ill. A7	5.75
Worcester,Mass. A7	6.05

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.375
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Cleveland A7	7.20
Donora,Pa. A7	7.20
Duluth,Minn. A7	7.20
Fostoria,O. S1	7.20
Johnstown,Pa. B2	7.20
Kokomo,Ind. C16	7.20
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
Muncie,Ind. I-7	7.40
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
So.Chicago,Ill. R2	7.20
So.SanFrancisco C10	8.15
SparrowsPt.,Md. B2	7.30
Struthers,O. Y1	7.20
Trenton,N.J. A7	7.50
Waukegan,Ill. A7	7.20
Worcester A7,J4,T6,W12	7.60

WIRE, Upholstery Spring

Aliquippa,Pa. J5	6.90
Alton,Ill. L1	7.075
Buffalo W12	6.90
Cleveland A7	6.90
Donora,Pa. A7	6.90
Duluth,Minn. A7	6.90
Johnstown,Pa. B2	6.90
KansasCity,Mo. S5	7.50
LosAngeles B3	7.85
Minnequa,Colo. C10	7.075
Monessen,Pa. P7, P16	6.90
NewHaven,Conn. A7	7.20
Palmer,Mass. W12	7.20
Pittsburg,Calif. C11	7.85
Portsmouth,O. P12	6.90
Roebling,N.J. R5	7.20
So.Chicago,Ill. R2	6.90
So.SanFrancisco C10	7.85
SparrowsPoint,Md. B2	7.00
Trenton,N.J. A7	7.20
Waukegan,Ill. A7	6.90
Worcester,Mass. A7	7.20

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	11.375
Bartonville,Ill. K4	11.30
Buffalo W12	11.20
Chicago W13	11.20
Cleveland A7	11.20
Crawfordsville,Ind. M8	11.30
Fostoria,O. S1	11.20
Jacksonville,Fla. M8	11.73
Johnstown,Pa. B2	11.20
Kokomo,Ind. C16	11.20
Minnequa,Colo. C10	10.95
Monessen,Pa. P16	11.20
Muncie,Ind. I-7	11.40
Palmer,Mass. W12	11.50
Roebling,N.J. R5	11.50
So.SanFrancisco C10	11.55
Waukegan,Ill. A7	11.20
Worcester,Mass. A7,T6	11.50

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	9.90
Buffalo W12	9.90
Johnstown,Pa. B2	9.90
Minnequa,Colo. C10	10.025
Monessen,Pa. P16	9.90
Muncie,Ind. I-7	10.10
Portsmouth,O. D2	9.90
Roebling,N.J. R5	10.20
SparrowsPt.,Md. B2	10.00

ROPE WIRE (A)

Alton,Ill. L1	9.45
Bartonville,Ill. K4	9.35
Buffalo W12	9.75
Fostoria,O. S1	9.75
Johnstown,Pa. B2	9.75
Monessen,Pa. P7	9.35
Monessen,Pa. P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Portsmouth,O. P12	9.35
Roebling,N.J. R5	10.06
SparrowsPt. B2	9.85
Struthers,O. Y1	9.75
Worcester J4, T6	9.65

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE

(Continued)

WIRE, Tire Bead

Alton, Ill. L1 .....12.75
Bartonville, Ill. K4 .....13.25
Monessen, Pa. P16 ....13.15
Portsmouth, O. P12 ....13.15
Roebling, N.J. R5 .....13.45

WIRE, Cold-Rolled Flat

Anderson, Ind. G6 .....7.95
Baltimore T6 .....8.25
Buffalo W12 .....7.95
Cleveland A7 .....7.95
Crawfordsville, Ind. M8 .8.05
Dover, O. G6 .....7.95
Fostoria, O. S1 .....7.95
Kokomo, Ind. C16 .....8.05
Franklin Park, Ill. T6 ...8.05
Massillon, O. R8 .....7.95
Milwaukee C23 .....8.15
Monessen, Pa. P7, P16..7.95
Pawtucket, R.I. N8 .....8.25
Rome, N.Y. (32) R6 ....7.95
Trenton, N.J. R5 .....8.25
Worcester A7, T6, W12.8.25

WIRE, Merchant Quality (6 to 8 gage) An'ld Galv.

Ala. City, Ala. R3.6.90 7.30**
Aliquippa J5 ....6.90 7.425‡
Atlanta A11 .....7.00 7.55
Bartonville(48) K4 7.00 7.55
Buffalo W12 .....6.90 7.30†
Cleveland A7 .....6.90 ....
Crawfordsville M8 .7.00 7.55
Donora, Pa. A7 ...6.90 7.30†
Duluth, Minn. A7 ..6.90 7.30†
Fairfield T2 .....6.90 7.30†
Houston, Tex. S5 ..7.30 7.70†
Jacks'ville, Fla. M8 7.425 7.95
Johnstown B2(48) .6.90 7.45*
Joliet, Ill. A7 ....6.90 7.30†
Kansas City, Mo. S5 7.50 7.90†
Kokomo C16 .....7.00 7.40†
Los Angeles B3 ..7.85 ....
Minnequa C10 ..7.15 7.55**
Monessen P7 (48) 6.90 7.45
Palmer W12 .....7.20 7.60†
Pitts., Calif. C11 ..7.85 8.25†
Portsmouth, O. P12 6.90 ....
Rankin A7 .....6.90 7.30†
So. Chicago R2 ...6.90 7.30**
S.S. Fran. C10 ...7.85 8.25**
Sparrows Pt. B2(48). 7.00 7.55*
Sterling (1) (48) N15 6.90 7.45
Struthers, O. (48) Y1 6.90 7.40‡
Worcester A7 ....7.20 ....

* Based on 11c zinc; † 5c zinc; ‡ Less than 10c zinc; **Subject to zinc equalization extras.

WOVEN FENCE, 9-15½Ga. Col.

Ala. City, Ala R3 .....146**
Ala. City, 17 ga. R2 ...241**
Ala. City, 15 ga. R2 ..251**
Aliq'ppa, Pa. 9-14½ga. J5 149‡
Atlanta A11 151
Bartonville, Ill. K4 151
Crawfordsville, Ind. M8 .151
Donora, Pa. A7 .....146†
Duluth, Minn. A7 .....146†
Fairfield, Ala. T2 .....146†
Houston, Tex. S5 .....154†
Johnstown, Pa. (43) B2 ..149
Joliet, Ill. A7 .....146†
Kansas City, Mo. S5 ....158†
Kokomo, Ind. C16 .....148†
Minnequa, Colo. C10 ..154**
Monessen, Pa. 9 ga. P17..151
Pittsburg, Calif. C11 ....169†
Rankin, Pa. A7 .....146†
So. Chicago, Ill. R2 ....146**
Sterling, Ill. (1) N15 149

† Based on 5c zinc; * 11c zinc; ‡ 10c zinc; **Subject to zinc equalization extras.

BALE TIES, Single loop Col.

Alabama City, Ala. R2 ...155
Atlanta A11 157
Bartonville, Ill. K4 157
Crawfordsville, Ind. M8 .157
Donora, Pa. A7 155
Duluth, Minn. A7 155
Fairfield, Ala. T2 155
Joliet, Ill. A7 156
Houston S5 163
Kansas City, Mo. S5 167
Kokomo, Ind. C16 157
Minnequa, Colo. C10 160
Pittsburg, Calif. C11 179
So. Chicago, Ill. R2 155
So. San Fran., Calif. C10 ..179
Sparrows Point, Md. B2 ..157
Sterling, Ill. (1) N15 155

WIRE, Barbed Col.

Alabama, City, Ala. R2 159**
Aliquippa J5 .....156‡
Atlanta A11 164
Bartonville, Ill. K4 164
Crawfordsville, Ind. M8 ..164
Donora, Pa. A7 .....159†
Duluth, Minn. A7 .....159†
Fairfield, Ala. T2 .....159†
Houston, Tex. S5 .....167†
Johnstown, Pa. B2 .....162*
Joliet, Ill. A7 .....159†
Kansas City, Mo. S5 .....171†
Kokomo, Ind. C16 .....161†
Minnequa, Colo. C10 ..165**
Monessen, Pa. P7 163
Pittsburg, Calif. C11 ....179†
Rankin, Pa. A7 .....159†
So. Chicago, Ill. R2 ....159**
S. San Francisco C10 ..179**
Sparrows Point, Md. B2..164*
Sterling, Ill. (1) N15 162

† Based on 5c zinc; * 11c zinc; ‡ 10c zinc; **Subject to zinc equalization extras.

WIRE (16 gage)

	An'd Galv.	Stone
Ala. City R2	...13.15	14.70**
Bartonville K4	..13.25	15.10
Buffalo W12	...13.15	....
Cleveland A7	...13.15	....
Crawfrdsville M8	13.25	15.10
Fostoria, O. S1	..13.25	14.80†
Johnstown B2	..13.15	15.00*
Kokomo C16	...13.25	15.10*
Minnequa C10	..13.40	15.10**
Palmer, Mass. W12	13.15	14.70*
Pitts., Calif. C11	..13.50	15.05†
So. Chicago R2	..13.15	14.70
Sparrows Pt.	B2 13.25	15.10*
Sterling (1)	N15..13.15	15.00
Waukegan A7	..13.15	14.70†
Worcester A7	...13.45	....

* Based on 11c zinc; † 5c zinc; ‡ 10c zinc; ** Subject to zinc equalization extras.

NAILS, Stock To dealers & mfrs. (7) Col.

Alabama City, Ala. R2 ...137
Aliquippa, Pa. J5 137
Atlanta A11 139
Bartonville, Ill. K4 139
Chicago, Ill. W13 137
Cleveland A9 142
Crawfordsville, Ind. M8...139
Donora, Pa. A7 137
Duluth, Minn. A7 137
Fairfield, Ala. T2 137
Galveston, Tex. D7 139
Houston, Tex. S5 145
Johnstown, Pa. B2 137
Joliet, Ill. A7 137
Kansas City, Mo. S5 149
Kokomo, Ind. C16 139
Minnequa, Colo. C10 142
Monessen, Pa. P7 137
Pittsburg, Calif. C11 156
Rankin, Pa. A7 137
So. Chicago, Ill. R2 137
Sparrows Pt., Md. B2 139
Sterling, Ill. (1) N15 137
Worcester, Mass. A7 143

NAILS, CUT (100 lb keg) To dealers (33)

Conshohocken, Pa. A3 ..$5.30
Wheeling, W. Va. W10 ...5.30

STAPLES, Polished Stock To dealers & mfrs. (7) Col.

Aliquippa, Pa. J5 138
Atlanta A11 140
Bartonville, Ill. K4 140
Crawfordsville, Ind. M8 ..140
Donora, Pa. A7 138
Duluth, Minn. A7 138
Fairfield, Ala. T2 138
Johnstown, Pa. B2 138
Joliet, Ill. A7 138
Kokomo, Ind. C16 140
Minnequa, Colo. C10 143
Monessen, Pa. P7 138
Pittsburg, Calif. C11 157
Rankin, Pa. A7 138
Sparrows Pt., Md. B2 140
Sterling, Ill. (1) N15 138
Worcester, Mass. A7 144

FENCE POSTS

	Col.
Chicago Hts., Ill. C2, I-2..	150
Duluth, Minn. A7	150
Franklin, Pa. F5	150
Johnstown, Pa. B2	150
Marion, O. P11	150
Minnequa, Colo. C10	155
Moline, Ill. R2	155
So. Chicago, Ill. R2	150
Tonawanda, N.Y. B12	150
Williamsport, Pa. S19	150

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(Base discounts, per cent off list, f.o.b. midwestern plants).

4 in. and shorter:
- ⅛-in. & smaller diam 2

Over 4 in. through 6 in.:
- ⅛ in. & smaller diam +3

6 in. and shorter:
- 7/16-in. and ⅝-in. .... +4
- ¾ in. and larger ... +6

Longer than 6 in.:
- All diameters .....+15

Lag bolts, all diams.:
- 6 in. and shorter 6
- Over 6 in. long ..... +2

Ribbed Necked Carriage +4
Hiank 10
Plow 23
Step, Elevator, Tap and Sleigh Shoes 10
Tire Bolts ..... +3
Boiler & Fitting-Up Bolts 21

NUTS

H.P. and C.P., regular & heavy:
- Square, all sizes 55

H.P., Hex, regular & heavy:
- ⅝" and smaller 55
- ⅞" to 1⅛", inclusive 56
- 1¼" to 1½", inclusive 60
- 1⅝" and larger 55

C.P. Hex regular & heavy:
- All sizes 55

Hot Galv. Nuts (all types):
- ⅝" or smaller 38
- ⅞" to 1⅛", inclusive 41

Finished Hex Nuts:
- New standard, all sizes 55

Semifinished & Slotted Hex:
- Regular and heavy, all sizes 55

SQUARE HEAD SET SCREWS

(1035 steel; packaged; per cent off list)

1 in. diam. x 6 in. and shorter 34
1 in. and smaller diam. x over 6 in. 30

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller 34
¼ in. diam. & larger .. 14
N.F. thread, all diams 5

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish .....41—10
Plated finishes .....21—10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:
- ¼-in. through ⅝-in. . 35
- ¾-in. through 1 in. .. 15

Longer than 6 in.:
- ¼-in. through ⅝-in. . 20
- ¾-in. through 1 in. .. 7

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.25
7/16-in. under..List less 37%

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	19.59	19.00
1¼	13	....	23.31	18.17
1½	13	21.40	26.65	20.75
1¾	13	25.28	30.31	24.53
2	13	28.33	33.97	27.45
2¼	13	31.91	38.26	30.95
2½	12	34.63	41.52	33.50
2¾	12	38.15	45.74	37.00
2⅞	12	41.31	49.53	40.07
3	12	44.05	53.82	43.72

RAILWAY MATERIALS

RAILS	Std. No. 1	Std. No. 2	All No. 2	Std. Toe Rails 60 lb Under
Bessemer, Pa. U5	4.45	4.35	4.40	5.35
Ensley, Ala. T2	4.45	4.35	...	5.35
Fairfield, Ala. T2	...	...	...	5.35
Gary, Ind. U5	4.45	4.35	4.40	...
Huntington, W.Va. W7	...	...	...	5.35
Indiana Harbor, Ind. I-2 ...	4.45	4.35	4.40	...
Johnstown, Pa. B2	...	...	...(16)	5.35
Lackawanna, N.Y. B2	4.45	4.35	...	5.35
Minnequa, Colo. C10	4.45	4.35	...	5.35
Steelton, Pa. B2	4.45	4.35	...	5.35
Williamsport, Pa. S19	...	...	...	5.35

TIE PLATES

Fairfield, Ala. T2 .....5.375
Gary, Ind. U5 .....5.375
Ind. Harbor, Ind. I-2 ...5.375
Lackawanna, N.Y. B2..5.375
Minnequa, Colo. C10 ...5.375
Seattle B3 .....5.425
Steelton, Pa. B2 .....5.375
Torrance, Calif. C11 ...6.425

TRACK BOLTS (20) Treated

Cleveland R2 .....11.50
Kansas City, Mo. S5 ....11.60
Lebanon, Pa. B2 .....11.50
Minnequa, Colo. C10 ...11.50
Pittsburgh O2, P14 ...11.50
Seattle, Wash. B3 .....12.00

AXLES

Ind. Harbor, Ind. S13 ....6.75
Johnstown, Pa. B2 .....6.75

JOINT BARS

Bessemer, Pa. U5 .....5.425
Fairfield, Ala. T2 .....5.425
Ind. Harbor, Ind. I-2 ...5.425
Joliet, Ill. U5 .....5.425
Lackawanna, N.Y. B2..5.425
Minnequa, Colo. C10 ...5.425
Steelton, Pa. B2 .....5.425

SCREW SPIKES

Cleveland R2 .....11.00

STANDARD TRACK SPIKES

Fairfield, Ala. T2 .....7.30
Ind. Harbor, Ind. I-2 Y1 7.30
Kansas City, Mo. S5 ....7.30
Lebanon, Pa. B2 .....7.30
Minnequa, Colo. C10 ....7.30
Pittsburgh J5 .....7.30
Seattle B3 .....7.80
So. Chicago, Ill. R2 .....7.30
Struthers, O. Y1 .....7.30
Youngstown R3 .....7.30

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge iron:	Cents
98+% Fe, annealed.	15.25
Unannealed:	
Minus 100 mesh....	11.75
Minus 35 mesh....	9.25
Minus 20 mesh....	9.00
Swedish, c.i.f. N.Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N. J., in bags....	9.50
Electrolytic iron:	
Melting stock, 99.91% Fe, irregular fragments of ¼ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)..	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns—83.00-148.00	
Aluminum: Atomized, 500 lb drums, frgt. allowed:	
Carlots	30.00
Ton lots	32.00
Antimony, 500 lb lots	32.00*
Brass, ¼-ton lots	29.75-37.75†
Bronze, ¼-ton lots	31.00-39.00†
Copper: Electrolytic	13.75*
Reduced	13.75*
Lead	7.50*
Manganese: Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed ...	89.50
Nickel-Silver, ¼-ton lots	44.25‡
Nickel-Silver, ¼-ton lots	47.00**
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	43.50
Solder	7.00*
Stainless Steel, 302 ..	91.00
Tin	14.50*
Zinc, ¼-ton lots, 17.25-31.00‡	
Tungsten	Dollars
Melting grade, 99% 50 to 200 mesh:	
1000 lb and over....	4.95
Less than 1000 lb ..	5.10
Chromium, electrolytic 99.2% Cr min, ...	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½" to 1 7/16"; 1 7/16" to 1 15/16" 4.75c; 1 15/16" to 7 5/16" 5.15c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.142 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 24" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 4.90c.
(27) Bar mill plate.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon and 0.35c H.S.-L.A.
(31) Widths over ⅝-in.; 6.40c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 12 gage & heavier; 36" & narrower.
(38) 14 gage & lighter.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. to mill some or within switching limits, 5.10c.
(43) 9-14½ gage.
(48) 6-7 gage.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Ambridge, Pa. N2	13.5	...	17.5	...	20	...	21.5	...	21.5	...	20.75	...	23.25	...
Lorain, O. N3	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Youngstown Y1	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Alton, Ill. L1	...	...	....	....	....	....	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Benwood, W. Va. W10	24	+4.5	15.25	+10.25	7.25	+17.25	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Butler, Pa. F6	25	+3.5	17	+8.5	9.5	+15	....	..	....	...	....	..	....	....
Etna, Pa. N2	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Fairless, Pa. N3	...	...	....	....	....	....	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Fontana, Calif. K1	...	...	....	....	....	....	10.75	+6.5	13.75	+2.5	16.25	1	18.75	2.25
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	22.75	5.5	25.75	9.5	28.25	13	30.75	14.25
Lorain, O. N3	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sharon, Pa. S4	25	+3.5	17	+8.5	9.5	+15	....	..	....	...	....	..	....	....
Sharon, Pa. M6	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sparrows Pt., Md. B2	23	+5.5	15	+10.5	7.5	+17	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Youngstown R2, Y1	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Wheatland, Pa. W9	23	+5.5	15	+10.5	7.5	+17	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25

Size—Inches	1¼		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.66		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Alton, Ill. L1	30.25	14.25	30.75	14.75	32.25	15	32.25	15	....	...	....	...
Benwood, W. Va. W10	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Etna, Pa. N2	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Fairless, Pa. N3	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Fontana, Calif. K1	19.25	3.25	19.75	3.75	21.25	4	21.25	4	12.5	+5.25	12.5	+5.25
Ind. Harbor, Ind. Y1	31.25	15.25	31.75	15.75	33.25	16	33.25	16	24.5	6.75	25.5	6.75
Lorain, O. N3	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Sharon, Pa. M6	13.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Sparrows Pt., Md. B2	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Youngstown R2, Y1	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Wheatland, Pa. W9	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75

*Galvanized pipe discounts based on current price of zinc (11.50c, East St. Louis).

Stainless Steel

(Representative prices, cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	41.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	41.50	41.50
302B	18.50	24.50	30.50	34.50	35.00	35.50	37.50	44.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	43.75	43.75
304L	....	....	36.00	41.00	39.25	42.25	44.75	48.75	48.75
305	19.50	25.50	....	36.25	37.00	37.25	40.00	46.50	46.50
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	48.00	48.00
309	26.50	34.75	42.75	49.25	49.25	50.50	53.75	62.00	62.00
309S	28.50	37.50	46.75	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	62.75	67.50	69.00	72.25	72.25
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.50	54.50	53.25	55.50	58.75	62.75	62.75
316L	....	....	51.50	59.50	58.25	60.50	63.75	67.75	67.75
317	33.00	43.50	57.25	66.75	67.50	68.25	70.75	77.00	77.00
318	33.50	44.00	55.25	64.50	66.25	65.50	68.75	80.25	80.25
321	22.75	29.50	35.25	40.75	41.00	42.00	45.75	50.50	50.50
347	34.50	45.75	53.75	61.50	62.00	63.25	68.25	76.50	76.50
18-SCbTa	28.25	37.25	45.00	51.25	52.00	52.75	57.50	65.50	65.50
403	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	34.25	34.25
416	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	33.00	38.50	52.75	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	34.75	34.75
430F	....	18.75	23.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	18.75	24.50	28.25	27.50	29.25	30.50	35.25	35.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	28.00	....	....	30.50	35.25	48.25	47.75
446	....	....	33.50	38.25	50.25	39.50	40.75	59.75	59.75
501	....	....	14.00	14.50	21.25	16.00	18.25	29.00	29.00
502	....	....	15.25	16.00	22.25	17.00	20.00	30.00	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co, Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
Stainless:			
302	....	31.00	31.00
304	27.60–28.10	32.50–33.20	32.50
310	36.50	41.00	....
316	32.60–33.10	37.70–42.75	42.75
318	37.00–37.50	42.20–42.70	....
321	29.36–29.80	34.40–37.00	37.00
347	30.40–30.90	35.50–40.50	40.50
405	23.40–23.90	30.60–31.10	....
410	22.00–23.40	30.10–30.60	....
430	23.40	30.60	....
Inconel	46.90	61.90	....
Nickel	38.30	51.70	....
Monel	39.70	52.66	....
Copper*	....	....	46.00

	Strip, Carbon Base: Cold-Rolled 10%	Cold-Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper*	28.55	35.85	25.00	32.25

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.26	5% Cr Hot Work	0.405
Extra Carbon	0.31-.315	W-Cr Hot Work	0.425
Special Carbon	0.37	V-Cr Hot Work	0.445
Oil Hardening	0.405	Hi-Carbon-Cr	0.73

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.030
18.25	4.25	1	4.75	...	2.245-2.415
18	4	2	9	...	2.615
18	4	2	....	...	1.705
18	4	1	....	...	1.540
14	4	2	5	...	2.185
13.75	3.75	2	5	...	2.185
13.5	4	3	....	...	1.805
9	3.5	..	....	...	1.115
6	4	2	....	5	1.045
6	4	3	....	6	1.290
1.5	4	1	....	8.5	0.900

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	56.50†	....
Gadsden, Ala. R2	52.38	52.88	....	....
Woodward, Ala. W15	52.38	52.88	56.50†	....
Cincinnati, deld.	....	60.58	....	....
Buffalo District				
Buffalo R2	56.00	56.50	57.00	57.50
Buffalo H1	56.00	56.50	57.00	....
Tonawanda, N.Y. W12	56.00	56.50	57.00	....
No. Tonawanda, N.Y. T9	....	56.50	57.00	57.50
Boston, deld.	66.65	67.15	67.65	....
Rochester, N.Y., deld.	59.02	59.52	60.02	....
Syracuse, N.Y., deld.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Chicago R2	56.00	....	56.50	....
Gary, Ind. U5	56.00	....	56.50	....
Indiana Harbor, Ind. I-2	56.00	....	56.50	....
So. Chicago, Ill. W14, Y1	56.00	56.50	56.50	....
So. Chicago, Ill. U5	56.00	....	56.50	57.00
Milwaukee, deld.	58.17	58.67	58.67	59.17
Muskegon, Mich., deld.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron, O., deld.	58.75	59.25	59.25	59.75
Lorain, O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem, Pa. B2	58.00	58.50	59.00	59.50
New York, deld.	....	62.28	62.78	....
Newark, deld.	61.02	61.52	62.02	62.52
Birdsboro, Pa. B10	58.00	58.50	....	....
Chester, Pa. C31	....	48.50	49.00	....
Philadelphia, deld.	....	50.16	50.66	....
Steelton, Pa. B2	58.00	58.50	59.00	59.50
Swedeland, Pa. A3	58.00	58.50	59.00	59.50
Philadelphia, deld.	59.66	....	....	....
Troy, N.Y. R2	58.00	58.50	59.00	59.50
Pittsburgh District				
Neville Island, Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	57.87	57.87	58.37
McKees Rocks, deld.	....	57.54	57.54	58.04
Lawrenceville, Homestead, Wilmerding, Monaca, deld.	....	58.16	58.16	58.66
Verona, Trafford, deld.	58.19	58.69	58.69	59.19
Brackenridge, deld.	58.45	58.95	58.95	59.45
Bessemer, Pa. U5	56.00	....	56.50	57.00
Clairton, Rankin, So. Duquesne, Pa. U5	56.00	....	....	....
McKeesport, Pa. N3	56.00	....	....	57.00
Midland, Pa. C18	56.00	....	....	....
Monessen, Pa. P7	56.00	....	....	....

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Youngstown District				
Hubbard, O. Y1	....	....	56.50	....
Sharpsville, Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield, O. deld.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie, Pa. I-3	56.00	56.50	56.50	57.00
Everett, Mass. E1	60.50	61.00	61.50	....
Fontana, Calif. K1	62.00	62.50	....	....
Geneva, Utah C11	56.00	56.50	....	....
Granite City, Ill. G4	57.90	58.40	58.90	....
Ironton, Utah C11	56.00	56.50	....	....
Lone Star, Texas L6	52.00	52.50*	52.50	....
Minnequa, Colo. C10	58.00	59.00	59.00	....
Rockwood, Tenn. T2	....	52.50*	56.50	....
Toledo, O. I-3	56.00	56.50	56.50	57.00
Cincinnati, deld.	61.76	62.26	....	....

*Low phos, southern grade. †Phos. 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.00 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson, O. G2, J1	$65.00
Buffalo H1	66.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Niagara Falls, N.Y. P15	$80.50
Keokuk, Iowa, Openhearth & Fdry, freight allowed K2	85.00
Keokuk, OH & Fdry, 12½ lb pigiets, 16% Si, frgt allowed K2	88.00
Wenatchee, Wash. OH & Fdry, freight allowed K2	85.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate A7	$61.00
Rockwood, Tenn. T3	70.00
Steelton, Pa. B2	64.00
Philadelphia, deld.	67.55
Troy, N.Y. R2	64.00

Warehouse Steel Products

Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except Birmingham and St. Paul, 15 cents; Philadelphia, New York, Boston and Los Angeles, 10 cents; Buffalo, 25 cents on C.R. and galvanized sheets, C.F. and alloy bars and 20 cents on other commodities; Houston, Seattle, Spokane, Wash., no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	Stainless Type 302‡§	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.¶	H.R. Alloy 4140††‡		Carbon	Floor
Baltimore	6.02	7.51	7.79	....	6.69	...	6.68	8.52*	12.04	6.72	6.37	7.76
Birmingham	6.35	7.35	8.25‡	....	6.60	...	6.50	9.10	....	6.65	6.65	8.45
Boston	7.23	8.23	9.52	44.78*	7.47	...	7.20	8.60	12.45	7.49	7.37	8.50
Buffalo	6.35	7.40	8.79	....	6.70	...	6.50	7.85	12.15	6.72	6.65	7.90
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.38	7.38	8.30	45.55	6.62	...	6.51	7.50	11.90	6.69	6.52	7.64
Cincinnati	6.49	7.37	8.30	45.80	6.86	...	6.75	7.80	12.15	6.86	6.81	7.89
Cleveland	6.38	7.38	8.45	45.66	6.72	...	6.57	7.60	11.96	7.02	6.69	7.81
Detroit	6.57	7.57	8.58	43.50	6.90	7.36	6.79	7.79	12.10	7.16	6.80	7.83
Erie, Pa.	6.35	7.38	8.30	....	6.70	...	6.50	7.45*	....	6.69	6.52	7.64
Houston	7.35	7.80	9.93	....	7.70	9.30	7.70	9.50	....	7.60	7.35	8.75
Los Angeles	7.40	9.25	9.85	50.15	7.75	11.75	7.35	10.05	13.20	7.55	7.35	9.45
Milwaukee	6.47	7.47	8.39	....	6.71	...	6.60	7.69	11.99	6.86	6.61	7.73
Moline, Ill.	6.73	7.73	8.65	....	6.97	...	6.86	7.85	....	7.04	6.87	...
New York	6.97	7.91	8.79	44.45	7.56	...	7.37	8.73*	12.28	7.38	7.27	8.68
Norfolk, Va.	7.00	...	...	....	7.10	...	7.10	8.60	....	7.10	7.10	7.95
Philadelphia	6.19	7.44	8.26	41.98*	6.96	8.80	6.74	8.36*	12.10	6.54	6.49	7.51**
Pittsburgh	6.38	7.38	8.30	45.50	6.72	...	6.51	7.85	11.90	6.69	6.52	7.64
Portland, Oreg.	7.60	8.75	9.35	48.50	7.85	...	7.55	10.95	14.00	7.50	7.45	9.35
Richmond, Va.	6.43	7.39	8.67	....	6.77	...	6.71	8.33	....	7.08	6.65	8.08
St. Louis	6.67	7.67	8.59	43.89	6.91	...	6.80	7.89	12.19	7.09	6.81	7.93
St. Paul	7.04	8.04	8.96	....	7.28	...	7.17	8.26	....	7.35	7.18	8.30
San Francisco	7.55	8.95	8.70	51.65	7.80	...	7.35	10.05	13.20	7.50	7.40	9.45
Seattle	8.10	9.80	10.15	50.50	8.20	...	7.80	10.95	13.65	7.75	7.80	9.60
Spokane	8.35	9.65†	10.05	....	7.80	...	7.80	10.85‡‡	14.40	7.45	7.55	9.60
Washington	6.70	7.99	7.97	....	7.37	...	7.38	9.09	....	7.31	7.05	8.16

*Prices do not include gage extras; †prices include gage and coating extras, based on 11-cent zinc except in New York, Philadelphia, Los Angeles, Cincinnati, Cleveland (11.50-cent zinc) and in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extra; §as rolled; **¼-in. and heavier; ††as annealed; ‡‡prices include $2 for crating; §§ under ½-in.

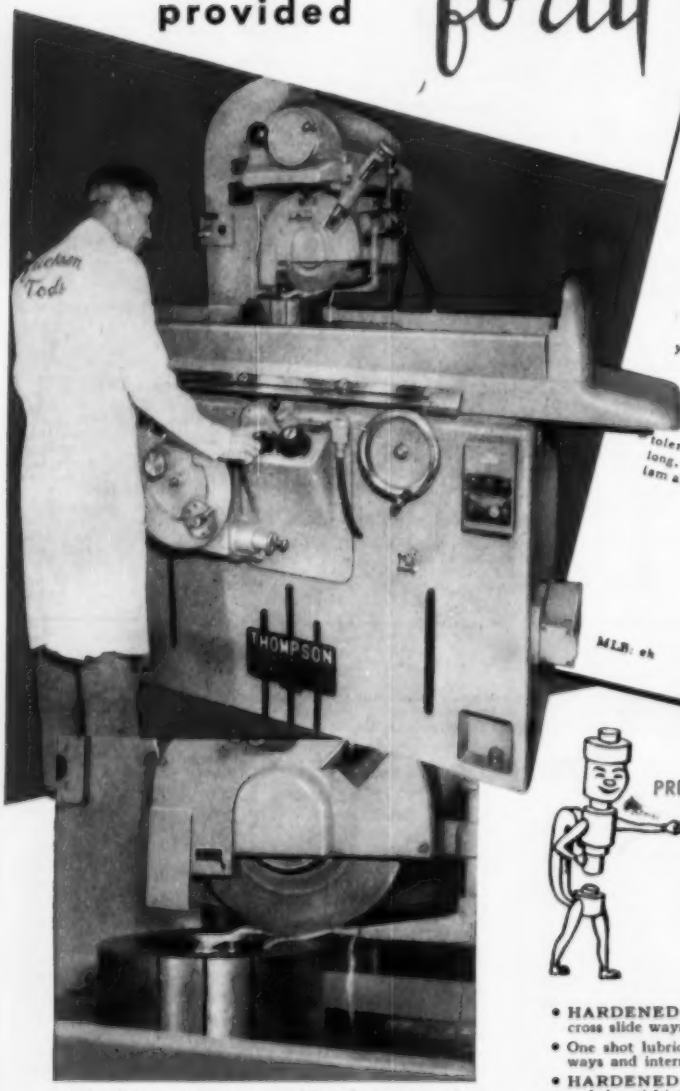
Base quantities, 2000 to 4999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over, except in Seattle, 2000 to 9999 lb; stainless sheets, 8000 lb except in New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999; §—500 to 9999 lb; ¶—4000 lb and over; ‖—1000 to 1999 lb; #—1000 lb and over; †—1500 lb to 3999 lb; *—f.o.b. local delivery in lots of 10,000 lb and over.

The Erickson Tool Company

asked for at least .0001 for parallelism and size. . .

The Thompson 2F (8x10x24) Super Precision Grinder

provided "forty millionths"



ERICKSON TOOL COMPANY
EAST 55TH AND HAMILTON AVENUE
CLEVELAND 14, OHIO

September 17, 1954

The Thompson Grinder Company
Springfield, Ohio

Attention: Mr. John Wilson,
Vice President.

Gentlemen:

May we take this opportunity to express our satisfaction with your Thompson 2F 8 x 10 x 24 Surface Grinder.

We purchased this grinder on your claim of .0001 for parallelism and else. This tolerance is necessary for most of our work.

Upon its arrival we asked a service man to prove this .0001 tolerance, using 5 blocks on a surface of 4 inches wide by 20 inches long. The test blocks showed .00004 (forty millionths) for parallelism and else. This was well within your guarantee.

Yours truly,

ERICKSON TOOL COMPANY

M. L. Benjamin,
President.

MLB: eh

PRECISION PETE says:

"You may be surprised to find that Thompson 2F Grinders cost less than some others and still provide all these features for greater accuracy and longer service. Fast delivery, too!"

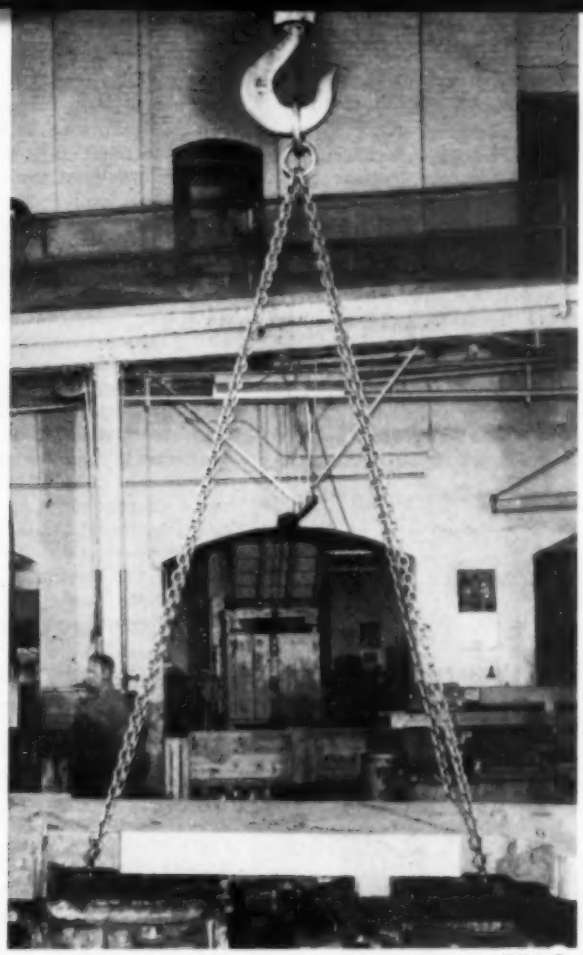
"Erickson products are sold and guaranteed to hold extreme accuracy. It is vital that we have the precision equipment necessary to manufacture these products. Our Thompson 2F Grinder delivers this precision. In the above picture we are grinding a #1200 expanding sleeve and hold within .0001 parallelism and size."

- **HARDENED AND GROUND** cross slide ways completely sealed.
- One shot lubrication to cross slide ways and internal saddle bearings.
- **HARDENED AND GROUND** sealed anti-friction vertical slide.
- **HARDENED AND GROUND BED WAYS** with automatic lubrication.
- 3600/1800 R.P.M. 2 speed wheel head. Heavy alloy steel spindle heat treated, runs in super precision ball bearings accurately preloaded, lifetime lubricated.
- Handy control panel.
- Elevation micrometer stop graduated in .0001"
- **GROUND THREAD FEED SCREW.**
- Automatic wheel **TRUING** device.
- Longitudinal hand feed with automatic engagement.
- Hydraulic head movement throttle with rapid traverse.
- Hydraulic table movement throttle.
- Elevating hand wheel graduated in .0005".

Call, write or wire for estimate

THE THOMPSON GRINDER COMPANY • SPRINGFIELD, OHIO

Thompson Grinders



McKay Co.

The chain's the same, but . . .

Tradition Gives Way in Pricing

REALISM has replaced a time-honored method of pricing industrial welded chain. The pound has given way to the foot. Effective last September, practically all chain, except conveyor chain, was placed on the more logical system.

The pound method of pricing dates so far back that few men in the industry can remember why it was used. But the best explanation seems to be that when all chain was made by crude hand methods, weight varied from one link to the next. Both buyer and seller figured if it were sold by the pound, the buyer would be getting what he paid for. But with the advent of electric welding, weight was more closely controlled, and a chain of any particular dimension was uniform throughout. Even though weldless chain has been sold by the foot for years, heavier industrial chain held to tradition.

Other Changes, Too—Two important changes accompanied the switch. Before September, chain was quoted on an f.o.b. plant basis; now it is on a delivered price basis for lots of 300 lb or more. The buyer knows exactly what his order is going to cost him per foot without having to add freight charges or extras to it.

Chainmakers have upped the price of their product. They point out that there has been no increase since 1950 despite the rising cost of materials and labor. So far, the increase in price has had no noticeable effect on sales, they report.

Early reports from buyers have been good for the most part. They, along with producers, have been complaining for some time about the old method because they use chain by the foot, not by the pound. Advantages of the new pricing system include more convenience for jobbers. Producers intend to work more closely with those jobbers, who sell most of the chain, except for big accounts, such as automotive, farm equipment and steel mills, who buy direct from the producer. A system of extra charges for small quantities by some producers will encourage small consumers to buy from jobbers. To acquaint its distributors with the new pricing system, McKay Co., Pittsburgh, published a special two-color price list for chain and attachments.

Where's the Snow?—As for current business conditions in the industry, 1954 stacks up as a fair year in comparison with any but the war years when chain producers had heavy military contracts. Next year will probably see some pickup in business along with the rest of the nation's economy. The fourth quarter is getting off to a slow start in at least one product classification—tire chains. A heavy snow in October brought a temporary flurry of orders from northern cities, but warm weather since then has cooled sales to practically zero.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 101 & 102

Automotive ordering of cold-rolled sheets appears to have peaked, but the mills are booked into first quarter, some reportedly being sold out for the period. Other consumers are seeking tonnage for delivery as far ahead as late January—and from their size, sheet sales managers believe first quarter 1955 will better that of 1954.

Brisk pace of consumption maintains galvanized sheet shipments at a high level. Hot-rolled sheet orders are gaining, though they lag behind demand for other flat-rolled products. Deliveries extend into January, however. Actually, hot-rolled strip is about the only item among the carbon grades still offered for delivery before year end.

Rolling mill schedules are filling more rapidly than at any time since allocations were removed. Stainless, enameling and silicon sheets are participating in the stronger demand, which is most in evidence in cold-rolled and galvanized.

Certain consumers, such as office furniture and kitchen cabinet makers, have only recently entered the market for the first time in months, indicating they have worked off inventories to the point where buying is necessary to maintain stocks on a normal basis, which, for some, is 60 days.

General Electric Co. is moving its

motor production from Lynn, Mass. A new production program for facilities at that point includes additional aircraft power unit assemblies, meaning less silicon and more stainless volume. Current improvement in stainless is due mostly to automotive orders.

Sale of cold-rolled strip facilities of the Stanley Works at Bridgeport, Conn., is the initial move in a transaction by which increased ingot production and hot-rolling equipment will be acquired and operated by interests connected with Ebasco Services, Inc., New York, and Estrabrook & Co., Boston investment bankers.

Two 30-ton electric furnaces will supplement three open hearths, 188,100 tons capacity, increasing raw steel capacity to about 300,000 tons. To broaden the number of finished steel products, a bar mill with capacity in excess of 100,000 tons annually will be installed for rolling carbon and alloy grades. The hot strip mill, rated at 150,000 tons, will be retained. Normal employment of slightly more than 600 at the Bridgeport plant will be increased.

Stanley Works, concentrating its future cold strip production at New Britain, Conn., sold the Bridgeport facilities to Mailman Bros., New York, former owners of Personna and Pal razor blade companies. They operate small plants at Bethlehem, Pa., Montreal and Toronto, Canada.

The cold strip mill at Bridgeport has rated capacity of 70,000 tons, 6 to 12½-in., also cold sizing and cold sizing finishing capacity slightly over the strip mill's capacity of 70,000 tons. The Mailman interests will take over the cold strip facilities Dec. 20. Meanwhile, the Stanley Works will operate ingot and hot-rolling capacity until the new company takes over. A certificate of necessity for $17 million for the project has been issued by the Office of Defense Mobilization.

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TO ✓ Cut down-time
✓ Lower per ton cost
✓ Increase melting capacity

SERVING THE STEEL INDUSTRY SINCE 1873 ★

The GLOBE BRICK Co.
EAST LIVERPOOL, OHIO

Tubular Goods . . .

Tubular Goods Prices, Page 104

Tubular goods market outlook is considered bright though fourth quarter sales of standard seamless and buttweld are expected to be only fair. Oil country goods demand still is declining.

Looking ahead to 1955, sales managers expect improvement in the first quarter. They think sales in the period should equal or exceed consumption. First quarter order books are open, however, and most consumers continue to order for only short periods ahead.

The active pace of construction this fall, with emphasis particularly on dwellings, apartments and commercial structures, is contributing to the substantial demand for commercial pipe in the East. But price cutting among distributors, however, is general.

Merchant pipe buying by New England distributors in the first 10 months this year was well below that in the like period of 1953. This was also the case with mechanical tubing. Direct shipments of seamless tubing, although currently off, have held up better.

The lag in distributor buying goes back to the allotment period, volume over recent months falling far below former allocations. It is evident that jobbers did not sell all the tonnage allotted them, much of it going into stock as a result. While inventories have been worked down no change in demand is expected before January.

Most wanted buttweld sizes can be obtained from stock and what orders are placed are on a delivery basis.

Cast iron pipe sales agencies in the Pacific Northwest report little interest in the market. Only small lots are moving from stock. Expectations are that larger buyers will re-enter the market in about 60 days.

Tin Plate . . .

Tin Plate Prices, Page 102

The larger canners are specifying tin plate lightly as they reduce inventories. They were built up as protection against a possible steel strike early last summer and higher prices. The price increase amounted to only 10 cents per 100 lb but many had feared it would be more.

Inventories at plants of smaller consumers have not been excessive. They haven't had the storage facilities or the money to carry large protective stocks. Considering the season, their buying this quarter has been well sustained.

The mills are feeling the effects of the sharp drop in specifications from larger canners. Even though operations have been reduced, producers are turning out more tin plate than they are shipping.

There is no question, however, that this has been a good year for tin plate. The food pack is off some this year, from all indications, but the decline in tin plate specifications is being cushioned by heavier needs for nonfood containers.

Plates . . .

Plate Prices, Page 100

Chrysler Corp. has placed 600 unfinished hulls for combat tanks with the Granite City, Ill., plant of General Steel Castings Co., not the Eddystone plant of General Steel Castings as recently reported. Also, 1200 hulls (believed to be finished) and 900 turrets were placed with the Continental Foundry & Machine Co., Pittsburgh, and 900 turrets with a company in the Wheeling, W. Va., area, it is reported.

Light requirements from the railroads and shipyards, as well as tapering needs for line pipe, are mirrored in the continued sluggish plate market. Mill shipments are expected to hold present levels over coming weeks, but a pickup is seen next quarter. Some dullness is due to seasonal slackening in construction and fabricators' efforts to hold inventories down as year end nears.

Inquiry for specific projects in New England, such as large fuel tanks, air base fueling systems, etc., is reported heavier. Bulk of tonnage required, however, will not be purchased until after Jan. 1. Meanwhile, plate volume is leveling off.

Depressing consumer operations are low competitive estimates for fabricated structures, including small tanks. Somewhat similar to the situation in fabricated structural steel, competition is exceedingly keen among tank fabricators.

Also, in addition to close figuring, there is another similarity, tank fabricators frequently are going out of their usual sphere of operations to get business. For example, companies engaged primarily in the fabrication of oil tanks are bidding more actively on water tanks. Water tank people are bidding on oil tanks. Some fabricators are going after larger jobs while shops that usually confine operations to large undertakings are going after small jobs. It is a hard tough scramble for business all around.

Yet, business is reasonably good among the tank fabricators, and while not comparable with that a year ago, most leading shops are able to sustain a fair rate of operations and reasonably substantial order backlogs. In fact, this situation is serving to bolster generally lagging plate demand. Mills can still give shipments within two weeks.

Market prospects are brightened by the virtual certainty that heavier tonnages will be required next year for shipbuilding. Sun Shipbuilding & Dry Dock Co. has been awarded three 32,000-ton high speed tankers by the Maritime Commission.

The Production-WISE
ROLL FORMING MACHINE

ARDCOR
MODEL 1-F

Spindle Diameter	1 1/2"
Roll Diameter	4 1/4" to 7"
Horizontal Distance Between Spindles	12"
Roll Space on Standard Machine	10"
Capacity Max.	.072

ADAPTABILITY — Ardcor Standard Forming Machines feature "unit construction" for each stand. Thus production changes are easily and quickly made. With this feature, any length base can be furnished to accommodate additional units as required.

Ardcor Roll Forming machines embody the precision, accuracy and stability found only in the highest grade machine tools. In addition, Ardcor offers a completely engineered installation—cradle reels, roll forming machines, roller dies, flying cut-off fixtures, etc. —from one qualified source.

Likely as not your special shapes can be ideally handled by a standard Ardcor machine. Your inquiry is invited—without obligation.

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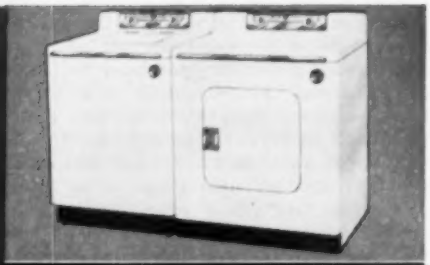

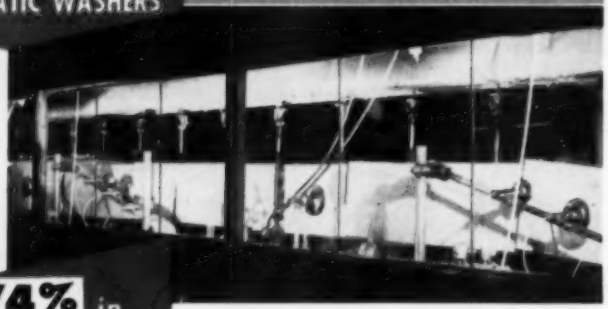

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Production is increased and quality of the work is improved over former hand spray method

● When General Electric formerly hand sprayed their home laundry equipment—automatic washers and dryers—they painted 9.74 washers with a gallon of paint. Now, in the new and modern plant at Appliance Park, Louisville—where they're using the Ransburg No. 2 Process—they get 17.97 units per gallon of paint. An increase of 84%!

And, where they formerly got 5.49 dryers per mixed gallon of finish, now—with the Ransburg No. 2 Electrostatic Spray Process—they get 9.56 dryers per gallon of paint. An increase of 74%!

Along with increased production, G.E. is getting a more uniform, higher quality finish. Another typical, on-the-job-example of the unmatched efficiencies of the Ransburg No. 2 Process of electrostatic spray painting!

Want to know what Ransburg Electrostatic Processes can do for you in your finishing department? Ask about the complete facilities for test-painting YOUR products—under simulated production conditions—in Ransburg laboratories.

Ransburg ELECTRO-COATING CORP.
Indianapolis 7, Indiana

RANSBURG

Alloy Steel . . .

Production of alloy steel (including stainless) in October rose to the highest level this year, reports the American Iron & Steel Institute. Output of alloy ingots and steel for castings totaled 632,342 net tons. This compares with 565,317 tons in September and 662,780 in October, 1953.

October production was 8.2 per cent of total steel output for the month. This compares with 7.9 per cent the previous nine months.

In the first 10 months this year output amounted to 5,684,966 tons, comparing with 9,107,479 in the like period of last year.

Pig Iron . . .

Pig Iron Prices, Page 105

A growing number of blast furnaces are resuming production. As the stacks are relighted, reports are more frequent that merchant iron shipments are improving steadily.

United States Steel Corp. blew in its No. 6 blast furnace at Edgar Thomson Works, Braddock, Pa. The stack returned to production Nov. 16 after a complete relining since May 14, 1953. Its daily capacity is 972 tons.

Pittsburgh Steel Co. relighted its No. 1 blast furnace at Monessen, Pa., Nov. 17. All three of Pittsburgh Steel's blast furnaces at Monessen are in full production for the first time since Nov. 13, 1953.

No. 2 blast furnace at Weirton Steel Co., Weirton, W. Va., is back in production, following relining and other repairs. That stack had been shut down in September. In addition to relining, the project at Weirton included installation of automatic handling and filling equipment.

Wisconsin Steel Co. relighted its No. 1 stack at South Chicago, Ill., Nov. 10. Of the Chicago district's 43 blast furnaces, 35 are active. This is the highest operating rate since December of last year when the same number were in blast.

Republic Steel Corp. relighted its No. 3 blast furnace Nov. 24 for production of merchant iron. This furnace has an annual capacity of 192,500 tons. This makes five out of six blast furnaces in operaton at the Cleveland plant. A total of 9 out of 11 furnaces are operating in the district, highest rate since last Dec. 7.

The pickup in operating rates is in anticipation of heavier demand after the turn of the year since there has been only a moderate improvement this month and a 10 per cent decline is expected in December due to seasonal influences.

Lacking backlogs, foundries are

(*Please turn to page* 115)

one stands out

...and REX is the standard by which all high speed steels are compared

It takes exceptional skill *and* experience to make consistent scores on the target range . . . or to produce consistently superior high speed steels.

Crucible has been making REX® High Speed Steels for over half a century . . . and REX is still the standard of comparison wherever high speed steels are used. That's no idle claim . . . and you can prove REX's superiority for yourself by putting a piece to work in your own shop. You'll like its hardenability, response to heat treatment, and good tool performance.

Once you've tried it, we think you'll agree — *you can't find a high speed steel that will outperform REX.*

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Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.

(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.). Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala.; Portland, Oreg., and Tacoma, Wash. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk max, 0.07% C, 29.95c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices 3c for max, 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electromanganese: Min carloads, 30c; 2000 lb to min carloads, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.00c per lb of alloy, carload packed, 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max, 0.025% C (Simplex) 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. S M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, S M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 24.75c per lb of contained chromium plus 12c per pound of contained silicon; 1" x down, bulk 24.90c per pound of contained chromium plus 12.2c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe). Contract, 1" x D; packed, max 0.50%, carload $1.16, ton lots $1.18; less ton $1.20. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 9c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 50-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primos and High Speed Grades** (V 50-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12c per lb of contained Si, carload packed 13.6c, ton lot 15.05c, less ton 16.7c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per pound contained silicon; carload packed 14.85c; ton lots, 16.05c; less ton, 17.4c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.4c per lb of contained Si, carload packed 15.7c, ton lot 16.85c, less ton 18.1c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 17.25c per lb of contained Si, carload packed 18.45c, ton lot 19.4c, less ton 20.45c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe). C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max, 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 25.25c per lb of alloy, ton lot 26c, less ton 27.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min M) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) Contract, lump, carloads 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.25c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.05c per lb of briquet, c.l. packaged 12.85c, ton lot 13.65c, less ton 14.55. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.75c per lb of briquet. Packed c.l. 7.55c, ton lot 8.35c, less ton 9.25c Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.9c. Packaged c.l. 7.7c, ton lot 8.5c, less ton 9.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02. f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $12 per lb of contained Cb, less ton $12.05. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $6.25 per lb of contained Cb plus Ta, deld.; less ton lots $6.30.

Silicax Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ⅛" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 16.6c per lb of alloy; ton lots 18.10c; less ton lots 19.35c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 15.50c. Packed c.l. 16.50c, 2000 lb to c.l. 16.75c, less than 2000 lb 17.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth, Pa., $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

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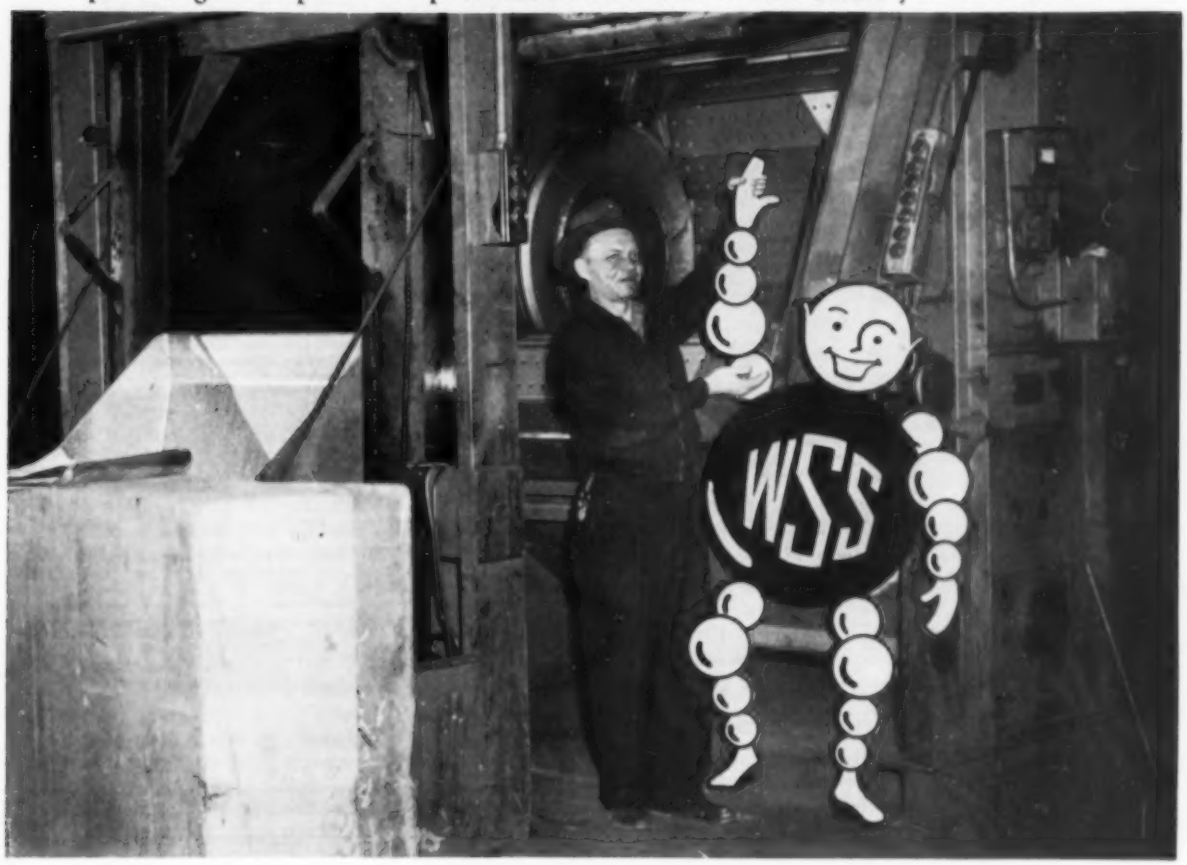

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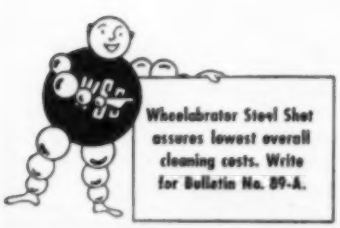
Scores Easy Victory in Blast Cleaning Performance at Swayne, Robinson & Co.

Scoring a 56.6% decrease in blast cleaning abrasive costs, Wheelabrator Steel Shot proved its superiority over a malleable iron abrasive at Swayne, Robinson & Co., Richmond, Indiana, in cleaning gray iron castings. As a result of the cost-slashing performance of this superior electric furnace steel shot, an abrasive saving of 86.8c was effected in cleaning every ton of castings.

These additional benefits further established Wheelabrator Steel Shot as the abrasive champion at Swayne, Robinson & Co. With its faster cleaning action, a reduction of three hours daily in the use of their Wheelabrator Tumblast was possible. Casting tonnage which had formerly required seven hours cleaning time is now Wheelabrated in just four hours.

Maintenance labor and machine wear were reduced, effecting additional savings. Quality of cleaning was greatly improved making possible the elimination of tumbling mills formerly used for desired surface appearance of certain types of castings.

Results like these can be duplicated in your cleaning room, too. Wheelabrator Steel Shot is produced under the most rigid controls to provide a metallurgically superior steel shot of uniform quality for the maximum economy in blast cleaning. It will clean faster at lower cost than any other abrasive. Try it and prove it for yourself.



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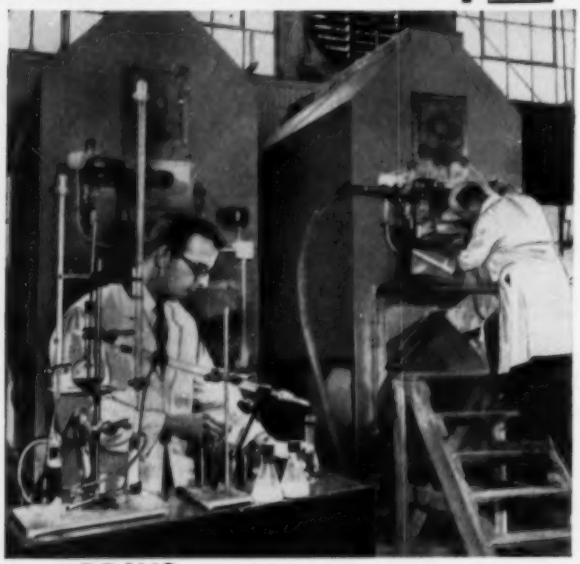

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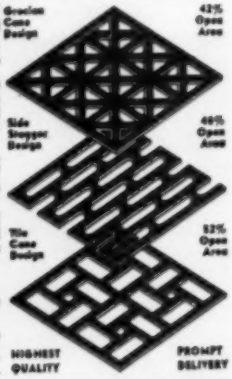

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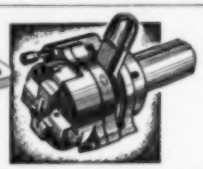

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(*Concluded from page* 110)

buying sparingly. In New England, a few shops, especially malleable, are operating somewhat higher than the general average.

The Charles Parker Co., Meriden, Conn., is discontinuing its iron foundry operations and is expanding facilities for production of nonferrous metals.

Iron Ore . . .

Iron Ore Prices, Page 115

Stocks of Lake Superior iron ore on lower lake docks and at furnaces on Nov. 1 totaled 51,868,432 gross tons, reports the Lake Superior Iron Ore Association. This was an increase compared with 49,752,763 tons in stock on Oct. 1 but was off compared with the 55,698,837 tons held on Nov. 1 a year ago.

Of the total, 44,979,615 tons were at furnaces and 6,888,817 tons on U. S. Lake Erie docks. On the same date last year the furnaces held 47,418,788 tons, the docks 8,280,049.

Consumption of ore during October amounted to 5,398,398 gross tons. This compares with 4,619,843 tons in September and 8,131,437 tons in October a year ago.

Reflecting marked improvement in blast furnace operations over recent weeks, 141 stacks out of a total of 205 in the U. S. and Canada were in blast on Nov. 1. This was an increase of 13 in October.

Shipments of Lake Superior iron ore in the latest week of record (ended Nov. 22) totaled 596,532 gross tons, reports the Lake Superior Iron Ore Association. This compares with 1,607,731 tons in the like week a year ago. Cumulative shipments of ore to Nov. 22 in the 1954 lake shipping season were 60,421,470 gross tons, compared with 95,709,818 in the like period of the 1953 season.

Rails, Cars . . .

Track Material Prices, Page 103

Rail makers experienced a drop in rail demand this year and look for a still further decline in 1955. Two leading eastern railroads have not entered the market for next year's needs.

The New York Central, it is estimated, will carry over 25,000 tons of unlaid rail into next year. The Pennsylvania will carry over an even larger tonnage, it is believed.

Freight car backlogs as of the beginning of this month were a little better than at the start of the previous month—12,853 units against 11,993, a gain of less than 1000 cars. This is revealed by the American Railway Car Institute and the Association of American Railroads.

Ores

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	20.00
N. African hematite (spot)	nom. 20.00-22.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite, good commercial quality	$25.00-$26.00
Domestic scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, 90c-92c per long ton unit c.i.f. U. S. ports, duty for buyer's account: 46-47%, 80c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $40.00-$42.00
48% 3:1	42.00-44.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	31.00-32.00

Domestic

(Rail nearest seller)

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb, Mo content mines unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	$3.35-$3.85
60-65%	4.00-4.35

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Pueblo, Colo., $94; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $114; Salina, Pa., $119; Niles, O., $125; Los Angeles, Pittsburg, Calif., $137.20.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $120; Warren, Niles, O., Hays, Pa., $125; Morrisville, Pa., $123.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $130; Cutler, Utah, $121.55; Los Angeles, $127.85.

Super Duty: Hays, Sproul, Pa., Warren, Windham, O., Athens, Tex., $137; Morrisville, Pa., Niles, O., $140; Joliet, Ill., $143.

Semisilica Brick (per 1000)

Clearfield, Pa., $130.

Insulating Fire Brick (per 1000)

2300° *F:* Massillon, O. $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick (per 1000)

Dry Pressed: Bessemer, Ala., $64.60; Aisey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Mo., $77.50; Wellsville, O., $81.50; Clearfield, Pa., Portsmouth, O., $87; Perla, Ark., $109; Los Angeles $110.25; Pittsburg, Calif., $111.30.

High-Alumina Brick (per 1000)

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $181; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Clearfield, Pa., $225; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $260; Danville, Ill., $258; Clearfield, Pa., $267.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $147; Clearfield, Pa., $148.50; St. Louis, $159.30; Athens, Tex., $155.

Nozzles (per 1000)

Reesdale, Pa., $234.70; Johnstown, Pa., $240.70; Clearfield, Pa., $241.40; St. Louis, $259.45; Athens, Tex., $247.70; Bridgeburg, Pa., $267.50.

Runners (per 1000)

Reesdale, Pa., $183.50; Johnstown, Bridgeburg, Pa., $183.50; Clearfield, Pa., $185.50; St. Louis, $195.80; Athens, Tex., $191.80.

Dolomite (per net ton)

Domestic dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Narlo, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $15.10; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite (per net ton)

Domestic, dead-burned bulk, ¾-in. grains with fines: Luning, Nev., Chewelah, Wash., $38.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.50-$14.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.00
Swedeland, Pa., ovens	23.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, O., deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $35-$36; 70%, $32-$33; 60%, $28-$29. Imported net ton, duty paid, metallurgical grade: European, $28-$30; Mexican, $25.50.

Electrodes

(Threaded with nipple, unboxed f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Per 100 lb
2	24	$43.50
2½	30	28.00
3	40	27.25
4	40	26.00
5¼	40	25.75
6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18, 20	72	20.00

CARBON

40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.55

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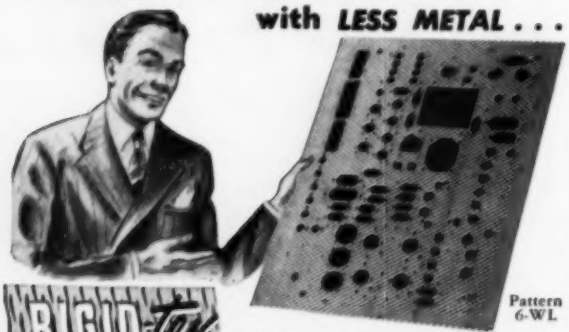

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Scrap . . .

Scrap Prices, Page 118

Philadelphia—Leading steel scrap grades are reported easier with No. 1 heavy melting quoted $32 to $32.50. Export demand is still the main prop, with two cargoes having moved out during the last week, three more ships scheduled for loading before the end of this month and still a fourth for loading early in December.

Not affected directly by export demand, prices on structurals and plate are higher at $36, delivered; rail crops, $46; and malleable cast, $43.

Pittsburgh—Dealers are selling small amounts of No. 1 heavy melting $1 below the price quoted a week ago. Demand is dull from open-hearth and electric furnaces and foundries. Some purchasing agents are holding out for a price of $32 to $33 on No. 1 heavy melting.

A prime consumer purchased limited amounts of No. 2 heavy melting at $28 to $29, $2 below the quotation of a week ago. That firm then announced its intention to place no more orders until year end.

Chicago—Despite a steelmaking rate of 88 per cent of capacity, highest this year, buying of scrap is at low ebb. But prices are unchanged. Actually, there has been no real test of the market recently. Increased buying before mid-December does not appear likely.

Detroit—The cleavage between No. 1 and No. 2 heavy melting steel grades continued to widen last week. But the closing of auto lists may bring prices more into balance. Observers report a somewhat softer market except on the No. 1 grades.

Boston—Steel scrap prices are inclined to soften without a fixed pattern. Normal differentials between grades are out of whack by $1 to $1.50 per ton, shipping point. Both heavy melting and bundles are involved. Primary grades are in a more confused state than No. 1 bundles for domestic shipment, which are quoted slightly higher than No. 1 heavy melting. New buying is off for both dock and domestic shipment. Cast iron is moving slowly. Slight, if any, demand pressure is noted with prices unchanged.

New York—Scrap brokers' buying prices are unchanged throughout the list with the general market tone less strong. The rail embargo in Jersey City on scrap is beginning to ease.

Buffalo—With steel production on the upturn, the local scrap market displays strength. Prices on the better quality steel grades jumped $1 per ton on mill buying last week. Blast furnace grades, at the same time, went up 50 cents.

Cincinnati—After a sharp rise, the market appears to be leveling off. Dealers displayed some bearishness last week. They now seek to ship an extra car or two on old contracts.

Cleveland—Scrap prices are unchanged, with the market apparently stabilized for the present. Relatively little buying is reported, but dealers' stocks have been pretty well worked down. However, the flow of industrial scrap is considerably up this month and is expected to rise further in December.

Los Angeles—Demand for steelmaking grades of scrap is slightly stronger. Most dealers report October sales were 5 to 10 per cent less than those in September.

San Francisco—Newly posted higher quotations for steel scrap have stimulated shipments from outlying areas, but they were easily absorbed by local yards.

Seattle—No. 1 and No. 2 heavy melting steel scrap are firm at $27 and $23 respectively. The market's firmer tone has not greatly stimulated shipments from the interior, though weather may be a factor.

Scrap dealers find no export interest. Local prices are not competitive with those in California. Japan is not buying heavily because of inadequate dollar balances. Two Japanese-flag tramps, however, are reported chartered for full scrap cargoes from California to Japan at $100,000 lump sum, each. California exporters also chartered a full cargo ship at $112,500 for discharge at Buenos Aires or Rosario, South America; also another tramp at $127,000, Rotterdam discharge. These cargoes will average between 9000 and 10,000 tons each.

Steel Bars . . .

Bar Prices, Page 100

Although bar mill tonnage is freely available (consumers are able to obtain most any size in hot-rolled within one to three weeks) demand is noticeably stronger. Deliveries on alloy material, both hot-rolled and cold-drawn, are more extended than they were, due largely to heavier automotive requirements.

Converters are specifying more freely in the East, and the same can be said of industrial fastener makers and miscellaneous manufacturers. New England area sellers report both carbon and alloy bookings for December are keyed to estimated consumption, with most consumers noticeably inventory-conscious as year end approaches.

Some sizable bar tonnage is reported building up in New England, notably on defense contracts for rifles, machine guns and small arms. These defense orders have doubled in the second half of the year and inquiry for steel is coming out for fixed monthly tonnages. More volume for forge shops is on order books, starting in January. Pittsburgh mills report first quarter shell contracts will be up from those in the current quarter.

Significantly, while shipments are only slightly more extended than they were a few weeks back, there are only limited openings in December rolling schedules.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 100

Seasonal slackening in construction is reflected in softer reinforcing bar prices as competition for orders intensifies. The easier price tone is noted at virtually all market centers, but is more in evidence at some points than others.

Bar volume is reported satisfactory in New England. District bar prices are soft, however, a situation that usually prevails when supplies are ample even though substantial tonnage is pending before the market.

Contractors are buying fabricated bars in New England at from 7 to 8 cents per lb while bidding 12 to 14 cents on steel in place. Most contractors' margin on steel is substantial, and they are taking advantage of the low prices by shopping for the lowest bids.

At Pittsburgh reinforcing interests report a decline is beginning in construction projects using bars. While demand still is relatively high, competition is increasing, resulting in weaker prices. Nearing year end, district sellers say sales this year were good over-all.

Several sizable projects calling for

(*Please turn to page* 120)

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COMPANY.....
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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Nov. 24	$33.08
Nov. 17	33.67
Oct. Avg.	32.25
Nov. 1953	35.00
Nov. 1949	28.96

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	*33.00-34.00*
No. 2 heavy melting	*28.00-29.00*
No. 2 bundles	*26.00-27.00*
No. 1 bundles	*33.00-34.00*
No. 1 busheling	*32.00-33.00*
Machine shop turnings	19.00-20.00
Mixed borings, turnings	19.00-20.00
Short shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Cut structurals, 5 ft lengths	35.00-36.00
Heavy turnings	30.00-31.00
Punchings & plate scrap	36.00-37.00
Electric furnace bundles	36.00-37.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Charging box cast	32.00-33.00
Heavy breakable cast	31.00-32.00
Unstripped motor blocks	23.00-24.00
No. 1 machinery cast	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	*36.00-37.00*
Rails, 2-ft and under	45.00-46.00
Rails, 18-in. and under	46.00-47.00
Rails, random lengths	39.00-40.00
Railroad specialties	37.50-38.50

Stainless Steel Scrap

18-8 bundles & solids	180.00-190.00
18-8 turnings	85.00-90.00
430 bundles & solids	70.00-75.00
430 turnings	55.00-57.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	32.00-33.00
No. 2 bundles	24.00-25.00
No. 1 busheling	32.00-33.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	34.00-35.00
Cut structural plate 2 ft and under	38.00-39.00
Alloy free, short shovel turnings	23.00-24.00
Electric furnace bundles	33.00-34.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	33.00-34.00
Stove plate	38.00-39.00
Heavy breakable cast	30.00-31.00
Unstripped motor blocks	30.00-31.00
Brake shoes	31.00-32.00
Clean auto cast	44.00-45.00
No. 1 wheels	37.00-38.00
Burnt cast	29.00-30.00
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00
R.R. malleable	44.00-45.00
Rails, 3-ft and under	47.00-48.00
Rails, 18 in. and under	48.00-49.00
Rails, random lengths	44.00-45.00
Cast steel	36.00-37.00
Railroad specialties	36.00-37.00
Uncut tires	37.00-38.00
Angles, splice bars	43.00-44.00
Rails, rerolling	52.00-53.00

Stainless Steel (Brokers' Buying Prices)

18-8 bundles, solids	175.00-180.00
18-8 turnings	70.00-80.00
430 clips, bundles, solids	70.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	34.00-35.00
No. 2 bundles	26.00-27.00
Machine shop turnings	14.00-15.00
Short shovel turnings	22.00-23.00
Cast iron borings	22.00-23.00
Low phos.	36.00-37.00
Electric furnace bundles	36.00-37.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00

CHICAGO

No. 1 heavy melting	*33.00-34.00*
No. 2 heavy melting	30.00-31.00
No. 1 factory bundles	34.00-35.00
No. 1 dealer bundles	32.00-33.00
No. 2 bundles	23.00-24.00
No. 1 busheling	*33.00-34.00*
Machine shop turnings	16.00-17.00
Mixed borings, turnings	18.00-19.00
Short shovel turnings	18.00-19.00
Cast iron borings	18.00-19.00
Cut structurals, 3-ft	35.00-36.00
Punchings & plate scrap	35.00-36.00
Electric furnace bundles	34.00-35.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Stove plate	32.00-33.00
Unstripped motor blocks	25.00-26.00
Clean auto cast	42.00-43.00
Drop broken machinery	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00
R.R. malleable	42.00-44.00
Rails, 2-ft and under	50.00-51.00
Rails, 18-in. and under	51.00-52.00
Angles, splice bars	43.00-44.00
Rails, rerolling	54.00-55.00

Stainless Steel Scrap

18-8 clips & solids	175.00-180.00
18-8 turnings	75.00-80.00
430 clips & solids	65.00-70.00
430 turnings	30.00-40.00

Chicago Mercantile Exchange

No. 1 Heavy Melting (Week ended No. 23)

	High	Low	Close
Jan.	35.375	35.00	35.375
Mar.	36.00	36.00	36.00*

Sales (40-ton units): 3 January; 1 March. *Nominal.

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*27.00*
No. 2 heavy melting	20.00
No. 1 bundles	*28.00*
No. 2 bundles	19.50
No. 1 busheling	*27.00*
Machine shop turnings	12.00
Mixed borings, turnings	12.00
Short shovel turnings	14.00
Punching & plate scrap	*28.50*

Cast Iron Grades

No. 1 cupola	34.00
Charging box cast	27.00
Stove plate	30.00
Heavy breakable	25.00
Unstripped motor blocks	20.00
Clean auto cast	38.00
Malleable	30.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	27.00-28.00
No. 1 bundles	30.00-31.00
No. 2 bundles	21.00-22.00
No. 1 busheling	30.00-31.00
Machine shop turnings	17.00-18.00
Mixed borings, turnings	18.00-19.00
Short shovel turnings	18.00-19.00
Cast iron borings	18.00-19.00
Low phos. 18-in.	35.00-36.00

Cast Iron Grades

No. 1 cupola	39.00
Heavy breakable cast	36.00
Charging box cast	36.00
Drop broken machinery	45.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
Rails, 18-in. and under	47.00-48.00
Rails, random lengths	39.00-40.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	*32.00-32.50*
No. 2 heavy melting	*30.50*
No. 1 bundles	*32.00-32.50*
No. 2 bundles	*26.50-27.50*
No. 1 busheling	*30.50-31.50*
Electric furnace bundles	33.50
Machine shop turnings	*19.00-19.50*
Mixed borings, turnings	19.00-19.50
Short shovel turnings	21.00-22.00
Structurals & plate	*35.00-36.00*
Heavy turnings	*30.00-31.00*
Couplers, springs, wheels	35.00
Rails crops, 2 ft & under	*46.00*

Cast Iron Grades

No. 1 cupola	35.00-36.00
Malleable	*43.00*
Heavy breakable cast	36.00-36.50
Drop broken machinery	42.00-43.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	27.00-28.00
No. 2 bundles	21.00
Machine shop turnings	10.00-11.00
Mixed borings, short turnings	11.00-12.00
Low phos. (structural & plate)	29.00-30.00
Short shovel turnings	12.50-13.50

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	23.00-24.00

Stainless Steel

18-8 sheets, clips, solids	170.00-175.00
18-8 borings, turnings	70.00-75.00
430 sheets, clips, solids	50.00
410 sheets, clips, solids	40.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*22.00-24.50*
No. 2 heavy melting	*18.25-19.50*
No. 1 bundles	*23.00-25.00*
No. 2 bundles	*16.50-17.00*
Mixed borings, turnings	10.00-10.50
Machine shop turnings	*9.00-9.50*
Short shovel turnings	11.50-12.00
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	32.00-33.00

BUFFALO

No. 1 heavy melting	*31.00-32.00*
No. 2 heavy melting	28.50-29.50
No. 1 bundles	*31.00-32.00*
No. 2 bundles	26.50-27.50
No. 1 busheling	*31.00-32.00*
Machine shop turnings	*18.00-19.00*
Mixed borings, turnings	*20.00-21.00*
Short shovel turnings	*21.00-22.00*
Cast iron borings	*20.00-21.00*
Low phos.	34.00-35.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	38.00-39.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	35.00-36.00
Rails, 3 ft and under	42.00-43.00
Railroad specialties	36.50-37.50

BIRMINGHAM

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	23.00-24.00
No. 2 bundles	19.00-20.00
Cast iron borings	16.00-17.00
Short shovel turnings	16.00-17.00
Machine shop turnings	15.00-16.00
Electric furnace bundles	29.00-30.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	45.00-46.00
Stove plate	42.00-43.00
Bar crops and plate	33.00-34.00
Structural plate, 2 ft	33.00-34.00
Unstripped motor blocks	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	30.00-31.00
Rails, 18-in. and under	40.00-41.00
Rails, rerolling	40.00-41.00
Angles, splice bars	38.00-39.00
Stand. steel axles	35.00-36.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	30.00
No. 2 heavy melting	28.00
No. 1 bundles	30.00
No. 2 bundles	23.50
Machine shop turnings	13.00
Short shovel turnings	15.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	29.00
Heavy breakable cast	29.00
Unstripped motor blocks	29.00
Brake shoes	30.00
Clean auto cast	41.00
Stove plate	35.00

Railroad Scrap

No. 1 R.R. heavy melt	35.00
Rails, 18-in. and under	46.00
Rails, random lengths	45.00-48.00
Rail, rerolling	52.00-53.00
Angles, splice bars	43.00

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	27.00
No. 2 heavy melting	23.00
No. 1 bundles	21.00
No. 2 bundles	17.00
No. 3 bundles	13.00
Machine shop turnings	12.00
Mixed borings, turnings	12.00
Short shovel turnings	12.00
Electric furnace, No. 1	32.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	32.00-35.00
Heavy breakable cast	23.00
Unstripped motor blocks	25.00
No. 1 wheels	21.00
Stove plate (f.o.b. plant)	28.00
Brake shoes	28.00

Railroad Scrap (Delivered consumer plant)

Rails, random lengths	30.00-34.00

LOS ANGELES

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	20.00
No. 2 bundles	16.00
Machine shop turnings	5.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	42.00-44.00

SAN FRANCISCO

No. 1 heavy melting	24.00
No. 2 heavy melting	20.00
No. 1 bundles	23.00
No. 2 bundles	18.00
No. 1 busheling	24.00
Machine shop turnings	6.00
Mixed borings, turnings	6.00
Short shovel turnings	9.00
Cast iron borings	9.00
Cut structurals	25.00
Heavy turnings	9.00
Punchings & plate scrap	25.00
Electric furnace bundles	19.00

Cast Iron Grades

No. 1 cupola	43.00-46.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	30.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting	26.00
No. 2 heavy melting	23.00
No. 1 bundles	26.00
No. 2 bundles	21.00
Mixed steel scrap	20.00
Mixed borings, turnings	12.00
Rails, remelting	35.00
Busheling, new factory: Prepared	24.00
Unprepared	20.00
Short steel turnings	12.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

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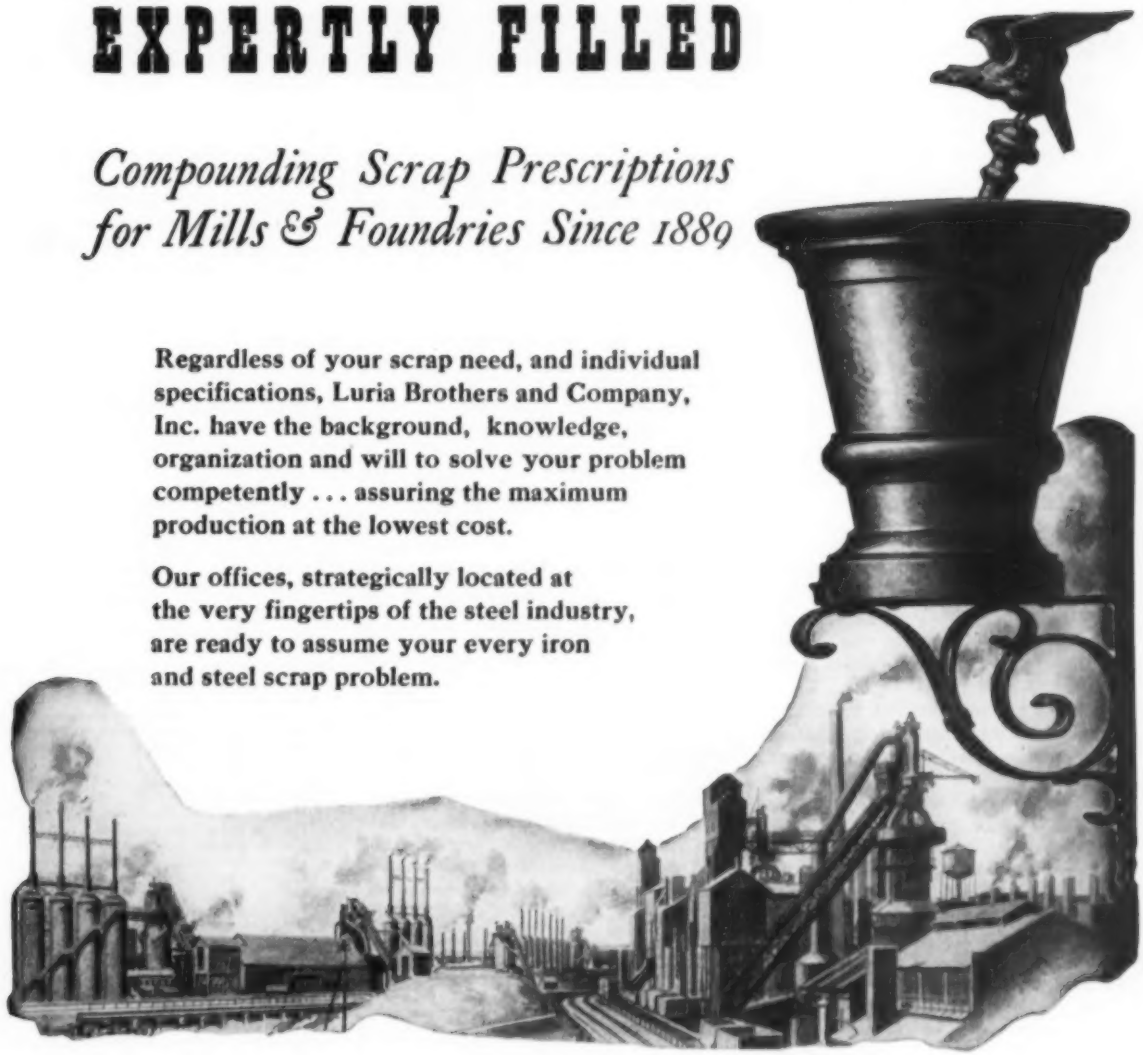

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(*Concluded from page* 117)

bars are pending. Bridge demands are heavy in New England where current warehouse, brewery and hospital contracts are taking 4000 tons alone.

Stainless Steel . . .

Stainless Steel Prices, Page 104

The recent sharp increase (5 to 6 cents per lb) in the price of type 347 stainless, initiated by one producer Nov. 1 and later followed by several others, is attributed largely to the jump in prices on ferrocolumbium and ferrocolumbium-tantalum since Oct. 1. This ore largely comes from Nigeria via England.

U. S. Steel Corp.'s new prices on this type stainless became effective Nov. 15. At the same time U. S. Steel issued new alloy addition extras on columbium and tantalum, columbium addition of 0.5 to 1 per cent now taking an extra of 32.25 cents per lb and columbium-tantalum 20 cents per lb. The previous extra on columbium, 0.5 to 0.8 per cent, was 9.25 cents per lb.

The 347 grade stainless is used to considerable extent in chemical and nuclear development work. The sharp increase in price caught many fabricators of equipment completely off guard, it is said.

Although higher nickel grades of nickel-silver for satisfactory plating are available, most manufacturers of tableware are continuing to use stainless in their products. Stainless was introduced when base metal for good finish was in short supply.

Demand for higher grades of stainless tableware has slackened, with the 300 series stainless strip in ample supply. The lower priced 410 grade of stainless ware, however, is still moving well.

Warehouse . . .

Warehouse Prices, Page 105

Warehouse steel sales are running a few percentage points above October levels in most districts. That's contrary to the usual seasonal pattern, and, coupled with the good volume of business placed last week, gives encouragement for the future.

A drop in December is anticipated as consumers will reduce purchases to match lower operations over the holidays and to keep inventories as low as possible over year end.

Although mill sales continue to improve, warehouse sales are not expected to make comparable gains until mill deliveries become more extended. When that situation develops, consumers will rely more heavily upon distributors for their smaller-order and emergency needs.

Distributors already are having difficulty in maintaining their inventories of cold-rolled and galvanized sheets, the tightest of the major steel items.

Structural Shapes . . .

Structural Shape Prices, Page 100

Although considerable structural steel inquiry continues before the market, the seasonal slackening in construction activity is intensifying competition for jobs. Fabricated steel prices, if anything, are as soft as at any time this year.

Bridge work dominates the market. In fact, the decline in estimating fabricated work in New England will be less than usual this winter, largely because of bridge tonnage.

The first contract, including eight bridges, East-West Massachusetts turnpike, closes Dec. 14 to be followed by two contracts weekly over a period of four to five months. Bridge needs are estimated at 50,000 tons.

Pending volume for military installations under direction of the Corps of Engineers are reported substantial. Hangars are included in proposed work, in New England the largest being at Falmouth, Mass., involving 2400 tons.

Among leading current awards in the New York city area is 4500 tons for a Broad street office building.

Texas fabricators appear to have underbid Pacific Northwest firms in competition for the two wing hangars for Larson Air Field, Washington state. The job involves about 500 tons of structurals. Bidding on this job reflects the intensive competition in the market, notably from out-district fabricators.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

13,000 tons, tunnel lining, Hampton Roads, Va., through Merritt-Chapman & Scott Corp., New York, general contractor, to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

6000 tons, superstructure, New Jersey approach Philadelphia-Gloucester bridge, awarded by the Delaware River Port Authority to Bethlehem Steel Co., Bethlehem, Pa.

4500 tons, 28-story office building, 20 Broad street, New York, to Lehigh Structural Steel Co., Allentown, Pa.

2400 tons, double cantilever hangar and shops, Otis Air Field, Falmouth, Mass., to Lehigh Structural Steel Co., Allentown, Pa., through Blunt Bros., Montgomery, Ala., general contractor.

820 tons, hangar, naval air station, Brunswick, Me., to American Bridge Division, U. S. Steel Corp., Pittsburgh, through the S. Volpe Co., Boston, general contractor.

325 tons, state bridge, Carbon county, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

225 tons, bridge, Reading railroad, Blandon, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

210 tons, garage, Southern New England Telephone Co., Hamden, Conn., to Topper & Griggs (Bethlehem Fabricators Inc.), Hartford, Conn., through Douglas & Orr, general contractors.

200 tons, Benjamin Franklin High School, Bristol, Pa., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

160 tons, laboratory, Du Pont interests, Falling Water, Va., to Belmont Iron Works, Eddystone, Pa.

130 tons, addition, Rayonier pulp plant, Hoquiam, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle.

STRUCTURAL STEEL PENDING

5250 tons, state highway bridge, Gary, Ind., bids Dec. 6, contract C-9, Indiana Toll Road Commission, Indianapolis.

3700 tons, state bridgework, Berks county, Pa., J. Richard Nissley, Landesville, Pa., low on general contract.

2400 tons, state highway, Milton-Quincy-Boston, including bridge over Neponset river; Marinucci Bros. & Co., Dorchester, Mass, low on general contract.

2000 tons, state bridgework, Mercer county, Pa., Fred W. Ewing Inc., Corry, Pa., low on general contract.

1200 tons, factory building, Du Pont Interests, Kern, Inc., bids Dec. 1.

855 tons, seven state bridges, Westbrook-Old Saybrook, Conn., bids Dec. 6, Hartford, Conn.

620 tons, four single span rolled beam bridges, Greenwich-Killingly expressway, Norwalk, Conn., bids Dec. 6, Hartford, Conn.

500 tons or more, two wing hangars, Larson Air Field, Washington state; T. C. Bateson Construction Co., Dallas, Tex., apparently low at $845,110 to U. S. Engineer, Walla Walla, Wash.

240 tons, state bridgework, Delaware county,

(*Please turn to page* 122)

Steel Import Prices

(Base, per 100 lb, landed, duty paid)

	North Atlantic	South Atlantic	Gulf Coast	West Coast*
Deformed Bars, Intermediate, ASTM-A-305	$5.05	$5.05	$4.95	$5.33
Bar Size Angles	4.60	4.60	4.60	4.98
Structural Angles	4.55	4.55	4.55	4.98
I-Beams	4.50	4.50	4.50	4.83
Wide Flange Beams	4.80	4.80	4.80	5.08
Sheet and Plate, 10 gage, 11 gage, 5' x 10'	5.50	5.50	5.50	5.78
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	26.80	27.00	26.80	27.60
Barbed Wire (†)	6.05	6.05	6.05	6.23
Merchant Bars	4.95	4.95	4.95	5.33
Hot-Rolled Bands	5.15	5.15	5.15	5.43
Wire Rods, Thomas Commercial No. 5	5.10	5.17	5.15	5.42
Wire Rods, O-H Cold Heading Quality No. 5	5.23	5.30	5.28	5.55
Bright Common Wire Nails	6.85	6.95	6.90	7.15

*Not including $2.20 per net ton customarily charged in most West Coast ports for wharfage and handling. †Per 82-lb. net, reel.

Sizes O.D.	Wgt/Foot/Lb	Gulf Port	West Coast	Vancouver
Seamless A.P.I. Casing, Grade J-55:				
5½ in.	15.5	$1.47/ft	$1.51/ft	$1.32/ft
7 in.	23	2.10/ft	2.17/ft	1.90/ft
Seamless N-80 Casing:				
5½ in.	17	1.94/ft	2.00/ft	1.75/ft
7 in.	23	2.50/ft	2.70/ft	2.36/ft
Seamless J-55 Tubing:				
2⅜ in.	4.7	0.60/ft	0.63/ft	0.55/ft
2⅞ in.	6.5	0.80/ft	0.83/ft	0.73/ft

Sources of shipment: Western continental European (Schuman Plan) countries.

CLASSIFIED

Help Wanted

IGNITRON ENGINEER CALIFORNIA
B.S. or M.S. in E.E., U. S. citizen, with interest in and preferably experience with pumped-down Ignitron rectifier-inverters. Will assume part responsibility for magnet power supply on new Bevatron, world's largest particle accelerator. Excellent opportunity to work alongside fundamental nuclear research. Twenty minutes from metropolitan San Francisco. Salary open. Professional Personnel Office, University of California Radiation Laboratory, Berkeley 4, California.

Assistant Superintendent for large Stainless Sheet and Strip Mill, located in Pittsburgh district. Must be familiar with processing methods of cold rolling, continuous annealing, pickling, etc. Should have supervisory experience. Please furnish information on background, experience, etc. with application. Reply Box 156, STEEL, Penton Building, Cleveland 13, Ohio.

SALES ENGINEER for large eastern steel plate fabricator. Must be thoroughly versed in all phases of Process Equipment such as Towers, Condensers, Autoclaves, Pipe fabrication, etc., both in steel and the alloys. Will operate out of metropolitan New York office and be willing to travel. Must have well-established reputation and reasonable following in the field. Salary Open. Reply Box 170, STEEL, Penton Building, Cleveland 13, Ohio.

Representatives Wanted

Manufacturers of heavy duty Integral Horsepower Polyphase motors for thirty years desire SALES REPRESENTATION in Pittsburgh, Cleveland and Buffalo districts. Reply Box 163, STEEL, Penton Building, Cleveland 13, Ohio.

Positions Wanted

PLANT AND PRODUCTION MANAGER, Engineering Graduate (M.I.T.) indoctrinated in practical operating experience. Proven record of accomplishment in efficient plant supervision, control, and cost reduction coupled with amicable labor relations. Reply Box 134, STEEL, Penton Building, Cleveland 13, Ohio.

EXPERIENCED FORGING ENGINEER AVAILABLE. Expert in hand tools and railroad work, production, design and management. Willing to travel. Passport in order. Reply Box 145, STEEL, Penton Building, Cleveland 13, Ohio.

FORGING ENGINEER WITH MANAGEMENT EXPERIENCE AVAILABLE FOR RESPONSIBLE POSITION WITH SMALL OR MEDIUM SIZED DROP FORGE SHOP. REPLY BOX 171, STEEL, PENTON BUILDING, CLEVELAND 13, OHIO.

STEEL METALLURGIST. Management, engineering and consulting experience in melting, rolling and heat treating operations in U. S. and abroad. Reply Box 172, STEEL, Penton Building, Cleveland 13, Ohio.

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For small long-established Forging Plant in Akron, Ohio. Prefer man who has a good knowledge of Small Upsetters (2" sizes), Drop Hammers (3000 lbs), Maxi Presses, Punch Press, Tool and dies, etc. Plant manufactures nationally known line of Mechanic Hand Tools.

If you have proven supervisory and management ability in directing a working force of approximately 50 people, write stating full particulars, salary expected, etc.

Box 155, STEEL

Penton Building Cleveland 13, Ohio

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ASSISTANT TO SUPERINTENDENT
HOT & COLD STRIP MILL
PITTSBURGH DISTRICT
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EXPERIENCE NECESSARY
BETWEEN AGE 30-40
PREFERENCE FOR COST ANALYSIS AND
OPERATIONAL PLANNING WORK
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APPLICATIONS TREATED
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ALL TYPES
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"ANYTHING containing IRON or STEEL"

POWER AUTHORITY OF THE STATE OF NEW YORK ADVERTISEMENT FOR PROPOSALS FOR THE FABRICATION AND ERECTION OF THE SUPERSTRUCTURE FOR THE BARNHART ISLAND BRIDGE OVER THE ST. LAWRENCE RIVER NEAR MASSENA, ST. LAWRENCE COUNTY, NEW YORK SPECIFICATIONS NO. 5422-C ST. LAWRENCE CONTRACT NO. 6

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the fabrication and erection of the superstructure for the Barnhart Island Bridge over the St. Lawrence River, near Massena, St. Lawrence County, New York, until 10:30 A.M., Eastern Standard Time, on the 7th day of December 1954, at 270 Broadway, Room 1207A, New York 7, New York, at which time and place proposals will be publicly opened and read aloud.

Plans, specifications and Proposal Forms for the work will be on file in the Authority's office and in the offices of Engineers, Praeger-Kavanagh, 126 East 38th Street, New York, New York; The Hydro-Electric Power Commission of Ontario, 620 University Avenue, Toronto 2, Ontario, and may be inspected by prospective bidders during office hours.

Plans, specifications and Proposal Forms may be obtained from the Power Authority of the State of New York, 270 Broadway, Room 1300, New York 7, New York, on or after November 15, 1954, upon application and pre-payment of a fee of Forty Dollars ($40.00) per set, no part of which will be refunded. Extra sets of plans at $20.00 each or specifications at $20.00 each may be obtained by any contractor who purchases a full set.

Bids must be made upon the proposal forms included in the Contract Documents. Each proposal must be accompanied by draft or certified check payable to the order of the Power Authority of the State of New York for the sum of One Hundred Fifty Thousand Dollars ($150,000.00).

The right is reserved to reject any or all bids.

W. S. CHAPIN, GENERAL MANAGER

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Set solid	50 words or less, $15.00, each additional word .30
All capitals	50 words or less, $19.20, each additional word .38
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Displayed classified rates on request
Address your copy and instructions to

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Penton Building Cleveland 13, Ohio

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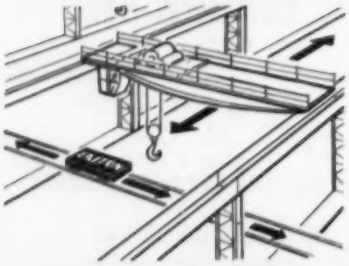

The EASTON motorized cross-bay transfer car is designed to provide lateral handling of materials to supplement overhead crane service in modern multiple bay plants. The cross-bay movement of the automatic transfer car provides a universal handling system able to spot a load anywhere on the floor of the plant. The same car system may also be used for moving materials between plant buildings.

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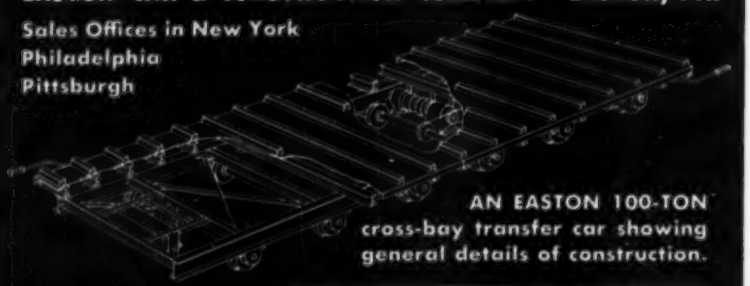

AN EASTON 100-TON cross-bay transfer car showing general details of construction.

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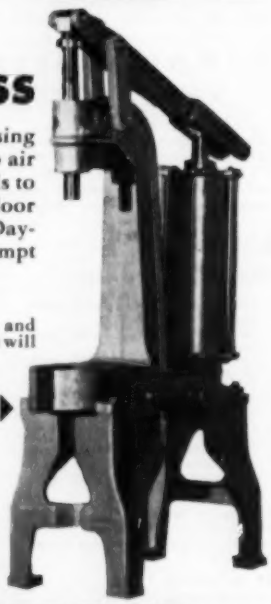
A-1046

SAVE!

WITH A HANNIFIN AIR PRESS

It's the ideal press for that occasional pressing job. These presses operate off ordinary shop air supply. They're fast and safe. Over 30 models to choose from...many for either bench or floor mounting. Capacities from ½ to 18 tons. Daylight to 46 inches...reach to 12 inches. Prompt delivery.



WRITE. Complete information and prices on Hannifin Air Presses will be sent on request.

6 Tons (Model B-2) One of more than 30 models. Press with base, $554.

1-ton Hand-D-Press. For small parts manufacturers. Press, $232.

Prices F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.

HANNIFIN

HANNIFIN CORPORATION, 523 S. WOLF ROAD, DES PLAINES, ILLINOIS

(*Concluded from page* 120)

Pa., Keelor Construction Co., Pennsburg, Pa., low on general contract.

235 tons, state bridgework, Lycoming county, Pa., bids Dec. 1.

Unstated, hangar project, McChord Air Field, Tacoma, Wash.; bids in to U. S. Engineer, Nov. 26.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1765 tons, department store warehouse, Jordan Marsh Co., Boston, to Bethlehem Steel Co., Bethlehem, Pa.; George B. H. Macomber Co., Boston, general contractor.

1610 tons, state hospital building, Worcester, Mass., to Concrete Steel Co., Boston; Farina Bros. Co., Watertown, Mass., general contractor.

1100 tons, including mesh, barracks project, Ft. Lewis, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; Wick Construction and Dahlgren Construction Co. joint low and awarded at $3,983,992.

775 tons, viaduct footings, contract 1, Northeast expressway, Chelsea, Mass., to Joseph T. Ryerson & Sons, Inc., Cambridge, Mass.; Berke-Moore Co., Boston, general contractor.

590 tons, brewery buildings, Carling Brewing Co., Cleveland, Natick, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Gilbane Building Corp., Providence, R. I., general contractor.

445 tons, six state bridges, Revere Beach parkway, Everett, Mass., to Truscon Steel Division, Republic Steel Corp., Boston; Gil Wyner Co., Malden, Mass.; general contractor.

350 tons, grade crossing elimination, Winchester, Mass., to Northern Steel, Inc., Medford, Mass.; C. J. Maney & Co., Lexington, Mass., general contractor.

100 tons, Shorline High School, Seattle, to Northwest Steel Rolling Mills Inc., Seattle; H. Halvorsen Co., Seattle, general contractor.

REINFORCING BARS PENDING

945 tons, state highway bridge, Gary, Ind., Indiana Toll Road Commission, Indianapolis.

925 tons, also 10 tons of shapes, Washington state bridge project, Seattle; Roy T. Earley Co., Tacoma, Wash., awarded contract at $1,008,944.

485 tons, seven state bridges, Westbrook-Old Saybrook, Conn., bids Dec. 6.

345 tons, Greenwich-Killingly expressway, Norwalk, Conn., bids Dec. 6.

100 tons, Washington state project, two slab bridges, Grant county; general contract to Snitely Bros., Wenatchee, Wash., low at $53,415.

100 tons, also 75 tons of shapes, Seattle city light Duwamish substation; bids called Dec. 8.

100 tons, 280-ft truss span, Clackamas county, Oreg.; Valley Construction Co., Portland, Oreg., low at $85,025 to the Bureau of Public Roads, Portland, Oreg.

PLATES . . .

PLATES PLACED

1000 tons, 60 and 66-in. diameter pipe, ⅛-in. wall thickness, for Hanford Works, Washington state, to Consolidated Western Steel Corp., Seattle; General Electric Co. prime contractor.

PLATES PENDING

105 tons, black, uncoated naval shipyard, Bremerton, Wash., bids Nov. 29.

PIPE . . .

STEEL PIPE PENDING

500 tons, mostly 20-in. seamless, fueling system, Otis Airfield Base, Falmouth, Mass.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Missouri Pacific, forty 1750-hp road switching units, to the Electro-Motive Division, General Motors Corp., La Grange, Ill., and twenty-six 1600-hp road switchers to the American Locomotive Co., New York.

RAILROAD CARS PENDING

Transportation Corps., Army, two-hundred-two, 10,000-gal. capacity tank cars. Marietta, Pa., Transportation Depot.

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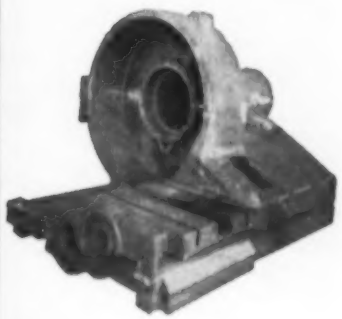
RED CIRCLE Rolls ALLOY-CHILLED

Gray Iron Castings

Castings of any size up to 80,000 pounds. Hyde Park facilities are equal to your every requirement



Machine Castings
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Pinion Housings
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Surface Plates

Hyde Park

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Hyde Park, Westmoreland County, Pa.

ROLLS
ROLLING MILL MACHINERY
GREY IRON CASTINGS

Steel to build a greater West

3 STEELMAKING PLANTS

LOS ANGELES • SOUTH SAN FRANCISCO
SEATTLE

With its steelmaking plants located in southern California, in the Bay Area, and in the Northwest, Bethlehem Pacific is equipped to provide Western industry with a wide variety of steel. Open-hearth and electric furnaces, various types of rolling mills, a wire mill, and metallurgical laboratories are coordinated to produce top-quality steel.

Besides having its own steelmaking facilities, Bethlehem Pacific sells the complete range of steel products made by Bethlehem Steel in the East.

3 BOLT AND NUT PLANTS

LOS ANGELES • SOUTH SAN FRANCISCO
SEATTLE

Bethlehem Pacific operates bolt-and-nut manufacturing plants adjacent to its three steelmaking units. Each of these plants is equipped with automatic, high-speed machinery for producing a full line of bolts and nuts, allied fasteners, and a wide range of steel specialties.

4 FABRICATING WORKS

LOS ANGELES • SOUTH SAN FRANCISCO
ALAMEDA • SEATTLE

Bethlehem Pacific's fabricating works are equipped to fabricate the steel for buildings, bridges, towers and miscellaneous structures of either small or large tonnage. Besides fabricating steel, this company also handles the erection of structural steel in any locality west of the Rocky Mountains.

5 SALES OFFICES

LOS ANGELES • SAN FRANCISCO • PORTLAND
SEATTLE • SPOKANE

All are staffed with experienced salesmen, ready at all times to serve Western steel users. And in each district, there are Bethlehem Pacific metallurgists to help customers solve steel problems.

BETHLEHEM PACIFIC

BETHLEHEM PACIFIC COAST STEEL CORPORATION
General Offices: San Francisco

BETHLEHEM STEEL

Can you use a compact drive with infinitely variable speeds?

HERE IT IS

Cleveland Speed Variator

NOW available in 9 sizes, ranging from one-half to 10 horsepower at 1750 input RPM.

INFINITELY variable, stepless speeds within a 9:1 range (from ⅓ to 3 times the input speed).

Smooth, instant change of speed by simple manual adjustment or by remote control devices, either manual or power operated.

Operating efficiencies—75% to 90%.

Coaxial input and output shafts, rotating in same direction, either clock-wise or counter clock-wise.

Ample bearing support for both input and output shafts to carry overhung pulleys.

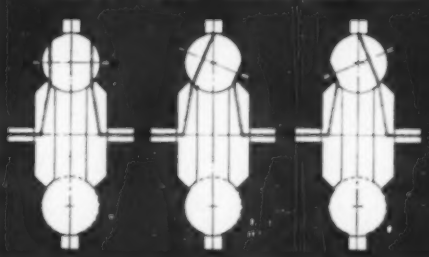
Compact and inherently quiet and smooth running, due to simple construction.

Minimum maintenance and long life, due to absence of belts and other complicated linkage.

Performance proved by prolonged tests in the laboratory and field operation.

These are the outstanding advantages of the Cleveland Speed Variator. It is now ready for service. Immediately applicable to a wide variety of machines and equipment where a dependable variable speed drive is required. For detailed description and specifications, write for Bulletin K-100.

HOW THE CLEVELAND SPEED VARIATOR WORKS



Power is transmitted from input shaft to output shaft through alloy steel driving balls which are in pressure contact with discs attached to the two shafts.

Relative speeds of the shafts are adjusted by changing the positioning of axles on which the balls rotate (see diagrams, left, and cutaway view, right).

THE CLEVELAND WORM AND GEAR COMPANY

Speed Variator Division, 3270 East 80th St., Cleveland 4, Ohio

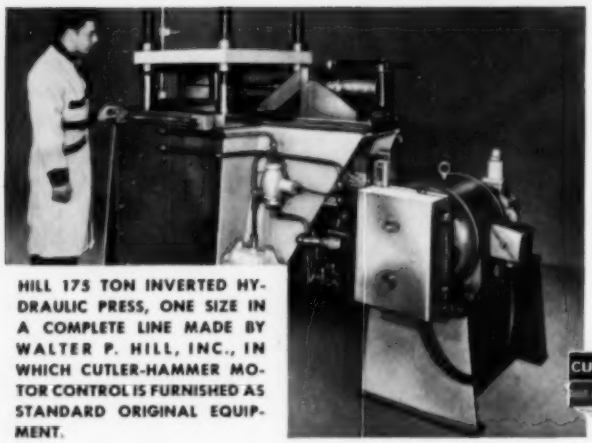
Sales Representatives in all major industrial markets

CUTLER-HAMMER

MOTOR CONTROL

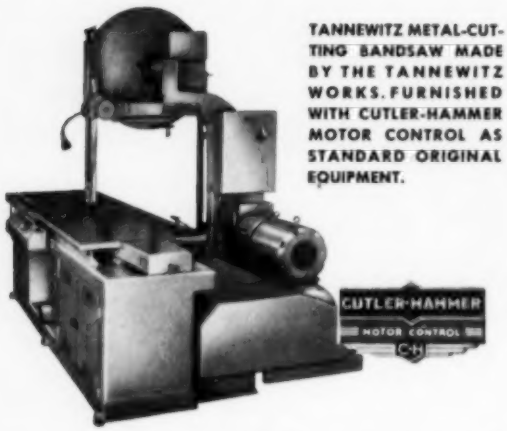
C-H

CHOICE OF THE LEADERS — THE MARK OF BETTER MACHINES

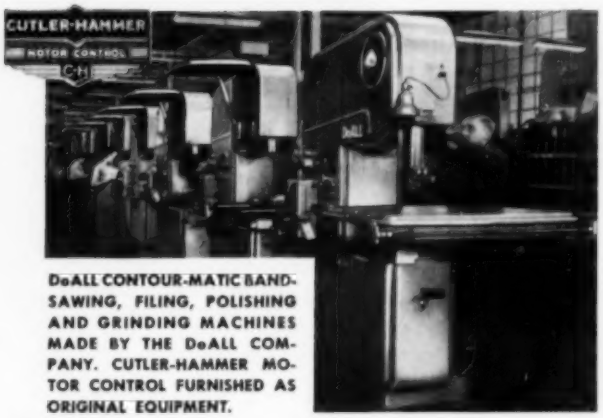


HILL 175 TON INVERTED HYDRAULIC PRESS, ONE SIZE IN A COMPLETE LINE MADE BY WALTER P. HILL, INC., IN WHICH CUTLER-HAMMER MOTOR CONTROL IS FURNISHED AS STANDARD ORIGINAL EQUIPMENT.

TURCHAN TRACER-CONTROLLED THREE DIMENSIONAL HYDRO-ROUTER MADE BY THE TURCHAN FOLLOWER MACHINE COMPANY. EQUIPPED WITH CUTLER-HAMMER MOTOR CONTROL.



TANNEWITZ METAL-CUTTING BANDSAW MADE BY THE TANNEWITZ WORKS. FURNISHED WITH CUTLER-HAMMER MOTOR CONTROL AS STANDARD ORIGINAL EQUIPMENT.



DoALL CONTOUR-MATIC BANDSAWING, FILING, POLISHING AND GRINDING MACHINES MADE BY THE DoALL COMPANY. CUTLER-HAMMER MOTOR CONTROL FURNISHED AS ORIGINAL EQUIPMENT.

Preferred . . . because proved

In the competitive struggle for business, there are a certain few companies in every field that forge steadily ahead. Their products are preferred by a majority of users and they enjoy a position of marked competitive advantage. That their products are preferred because these best fit the market's needs is hardly necessary to be stated. But that their products are *good* because the manufacturers struggle endlessly to make them *better* is significant indeed. It is worthwhile noting these manufacturers exert the most rigid control of quality in raw materials, processed parts and purchased components. The more critical the product *or the amount of money invested in the product*, the more stern and exacting are the requirements.

And it must make sense to any manufacturer of machines that leading machinery builders do specify and insist in large degree on Cutler-Hammer Motor Control for the vital functions in their products which are critical not only in their cost, but in the role these machines play in users' plants. Cutler-Hammer Motor Control *is* preferred because it has been *proved* . . . in thousands of plants over scores of years. Considering what the *right* motor control means, you too should specify Cutler-Hammer. CUTLER-HAMMER, Inc., 1211 St. Paul Avenue, Milwaukee 1, Wisconsin. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto, Ont.